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VOLUME TALBES FOR Juniperus monosperma AND Juniperus scopulorum

Joseph Howell Jr.

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Region 8
Albuquerque, New Mexico

- - -

Hugh G. Calkins
Regional Conservator

- - -

VOLUME TABLES FOR JUNIPERUS MONOSPERMA AND JUNIPERUS SCOPULORUM

By

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ROCKY MT. FOREST & RANGE
EXPERIMENT STATION

Albuquerque, New Mexico
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Please note the following addition to Regional Bulletin No. 59, Woodland Series No. 8, issued October 5, 1939 by the Soil Conservation Service, Albuquerque, New Mexico.

On page one under the heading "Measurements" at the end of the sentence on line 9, first paragraph, add the following: "Measurements of diameter at one foot and at breast height were made on the tallest stem of multiple stemmed trees."

VOLUME TABLES FOR JUNIPERUS MONOSPERMA AND JUNIPERUS SCOPULORUM*

INTRODUCTION

One-seed juniper (Juniperus monosperma (Engelm.) Sarg.) and Rocky Mountain Red Cedar (Juniperus scopulorum, Sarg.) have been of inestimable value in the development of the Southwest. The wood of these two trees is used for fuel, fence posts, poles, and miscellaneous construction materials. Furthermore, these junipers are highly important as watershed cover, especially on steep, stony slopes where the vegetation is otherwise scanty.

The one-seed juniper is a many-branched tree with a sprawling habit of growth, although occasionally it forms single stemmed trees of fair proportions, whereas Rocky Mountain red cedar is more inclined to form a single stem with little forking. Because of this variable growth habit, the variation in the quantity of wood products is large, and furthermore it is not always possible to use, or even secure, the measurements usually associated with volume.

MEASUREMENTS

Sample trees were taken throughout the coniferous woodland stands of the Upper Rio Grande Valley, New Mexico and on parts of the Navajo Indian Reservation in New Mexico and Arizona. Each tree was felled and then measured with a steel tape as follows: (1) Diameter at one foot above the average ground level; (2) Diameter Breast Height; (3) Total Height, vertical to highest point of tree; (4) Crown Length, to lowest green branch; (5) Average Crown Width, average of two diametrically opposite measurements; and (6) Number of 7 foot-5 inch top fence posts. After measuring, the tree was cut up into four foot pieces and those pieces measuring two inches or more at the middle outside bark were recorded. Besides the middle diameter, the diameter at the small end and average bark thickness were recorded. These sticks were stacked and then measured for stacked cubic volume and cord volume. The brush was piled compactly and measured for cubic contents.

The solid volume of each stick was determined by computation, Huber's formula. Each stick was assumed to be a cylinder four feet long, having a diameter equal to the diameter at the middle of each stick, outside the bark. The standard cord of 128 cubic feet was used in computing cord volume.

ANALYSIS

The methods of statistical analysis proposed by Bruce and Schumacher** and Snedecor*** were followed. The method of least squares was used to

* This work was performed under a cooperative agreement between the Soil Conservation Service and the Forest Service.

** Bruce, D. and Schumacher, F. X. Forest Mensuration. 360 pp. 1934.

*** Snedecor, G. W. Statistical Methods. 341 pp. 1937.

compute regression equations and other statistics. The alinement charts were prepared by standard methods. However, the aggregate errors by these methods were so great that it was necessary to resort to graphic methods in order to secure the desired degree of accuracy. The alinement charts were corrected until an aggregate deviation of two percent or less was secured. Also, all tables having an average percentage deviation of over 60 percent were discarded. The values in the tables were taken from the alinement chart and then plotted on coordinate paper as a means of detecting errors in reading.

ROCKY MOUNTAIN RED CEDAR

1. Volume table based on diameter at one foot and average crown width.

This is a new departure in the preparation of volume tables, but it has been found to be the best measure for determining volume in cubic feet of all sticks four feet long and two inches or over in diameter outside bark for the types of trees studied.

2. Volume table based on diameter breast height and total height.

This table is based upon the usual diameter breast height and total height measurements, and is satisfactory for field use. Because of the bushy habit of some of the trees, total height fails to have much influence in determining volume.

3. Volume table based on diameter at breast height and crown width.

This table departs from the usual table in that average crown width was substituted for total height. There is but little difference between this and the foregoing table; the most easily taken pair of measurements should decide the table to be used.

4. Volume table based on total height and diameter at one foot.

In this table, diameter at one foot was used instead of diameter breast height. This measurement can be as readily taken as the D.B.H. measurement. In this instance, such combination of independent variables did not improve the estimation of volume as much as is desirable because of the negative sign of the coefficient for total height. Furthermore, the height axis folds back upon itself, indicating that the trees above 25 feet in height have a disproportionate increase in the number of pieces and thus have a greater volume.

5. Volume tables for stacked cubic volume and cord volume based on diameter breast height and crown width.

These tables may be substituted for the volume tables based on partial cubic volume. They permit the conversion to cords or stacked volume without the use of conversion factors. The standard cord containing 128 cu. ft. was used. Here again average crown width is used instead of total height.

The cord volume table is a direct conversion of the stacked cubic volume table. The alinement chart contains both stacked cubic volume and cord volume.

ONE-SEED JUNIPER

This juniper has a much more variable form than the Rocky Mountain red cedar and, as a result, the average percentage deviations are higher; however, it is believed that they are sufficiently low to give satisfactory tables for the species.

1. Volume table based on diameter at one foot and crown width.

This combination of measurements gave the best results in an intensive study of the "Relation of Crown Diameter to Cubic Volume of One-Seed Juniper," Journal of Forestry, XXXV:9:829-831, 1937, and again gave the best results for the species. These two measurements are readily taken, although it is possible that those not accustomed to taking these measurements will have some difficulty at first.

2. Volume table based on diameter breast height and crown width.

This table has diameter breast height substituted for the diameter at one foot and gives a table essentially as good as the one above. The table most suitable to the work should be used.

3. Volume table for brush based on crown width and crown length.

The brush of one-seed juniper has been extensively used in soil and water conservation work to good advantage. This table has been prepared as an aid in determining the quantity of brush that can be removed from the stand. The table is for total brush and so must be reduced by a proper factor, usually to 1/5, to determine actual quantity to remove under the concealed cutting method.

The independent variable, crown width and crown length, was selected by inspection, as possibly being more closely associated with total brush volume than any other factor or pair of factors.

CONVERSION FACTORS FOR DETERMINING CORD VOLUMES

Rocky Mountain Red Cedar

During the course of the study 101 trees of Rocky Mountain red cedar were cut and the contents stacked. These trees yielded 8.61 standard cords or 0.085 cords per tree. One standard cord was found to contain an average of 64.24 solid cubic feet, or there was 50.2% solid wood in the cord.

One-Seed Juniper

Of this species, 574 trees were felled and stacked, yielding 70.96 standard cords, or an average of 0.124 cords per tree. One standard cord was found to contain an average of 63.30 cubic feet, solid, or 49.8% of the stacked volume was solid wood.

CONCLUSION

The tables presented here are to be considered satisfactory for field use in the Southwest for the coniferous woodland type. Because of the variability exhibited by cubic volume, these tables should be checked for local use and such corrections made as are deemed necessary. Further tables will be prepared in an endeavor to increase the accuracy of the volume estimate.

ROCKY MOUNTAIN RED CEDAR
(Juniperus scopulorum (Sarg.)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER
IN INCHES AT ONE FOOT AND CROWN WIDTH IN FEET

Arizona - New Mexico
1938

J. Howell, Jr.

Partial Contents with Bark Cubic Feet

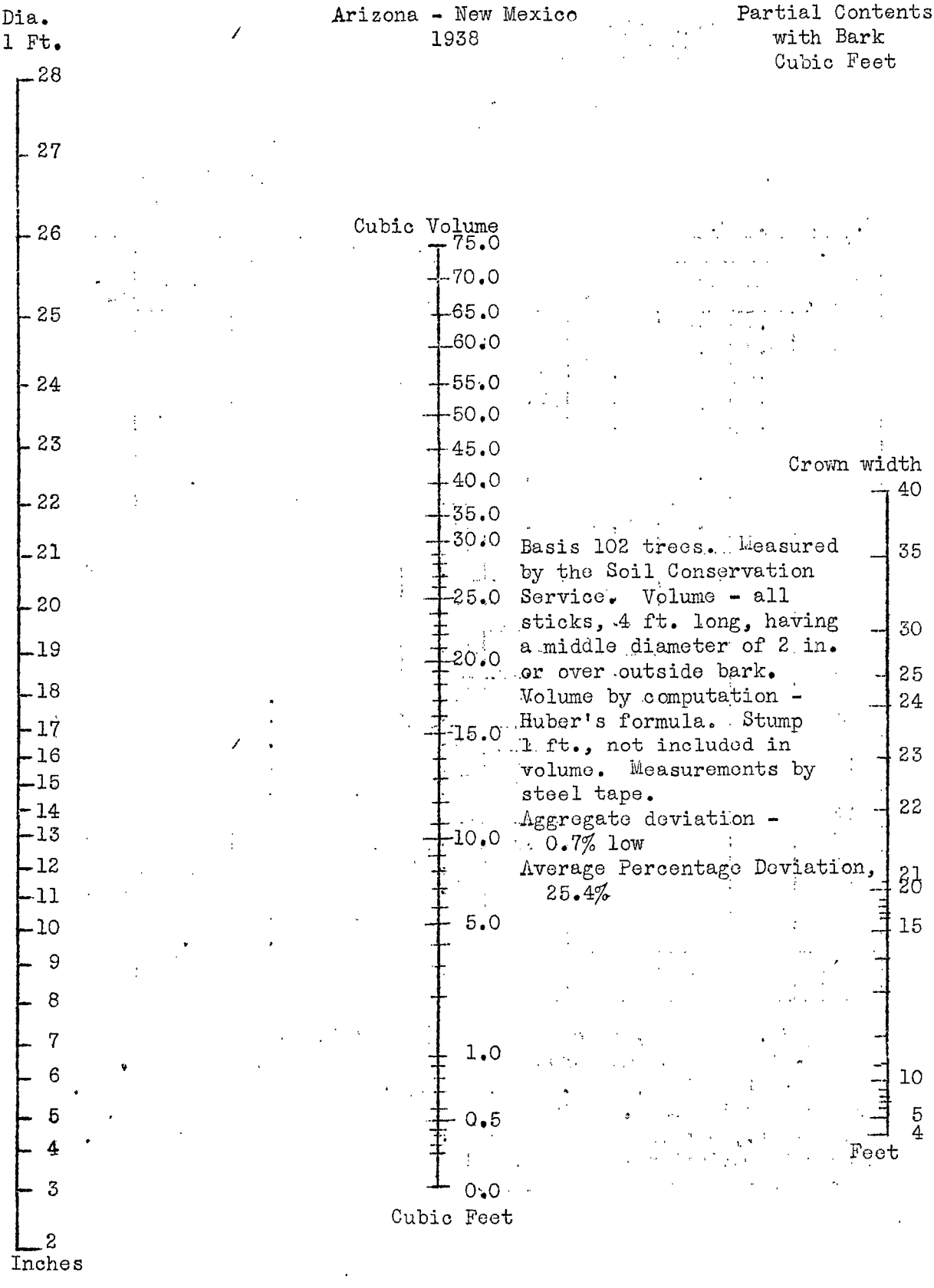
Dia. at 1 ft.	Crown Width - Feet								Basis No. of Trees
	5	10	15	20	25	30	35	40	
	Partial Volume - Cubic Feet								
3	0.10	0.30							8
4	0.29	0.53							6
5	0.51	0.65	1.35	1.45					16
6	0.68	0.78	1.70	2.20					15
7	0.78	0.94	2.20	2.80					5
8	0.94	1.16	2.90	3.60					8
9		1.43	3.85	4.70					8
10		1.80	4.75	5.70	11.00				3
11		2.25	5.65	6.70	11.75				4
12		2.75	6.50	7.60	12.40				3
13		3.37	7.40	8.48	13.00				4
14		4.03	8.22	9.40	13.75	15.40			7
15		4.60	9.03	10.25	14.40	16.20			2
16		5.50	9.98	11.00	15.15	17.25			3
17			10.85	11.80	16.00	18.35			3
18			11.70	12.55	17.00	19.75	22.50		0
19			12.65	13.40	18.30	21.20	24.40		0
20			13.55	14.50	20.50	23.40	26.20		2
21				15.90	22.50	25.50	28.60		1
22				17.50	24.80	28.00	31.40		0
23				19.95	27.20	30.80	36.80		0
24				23.40	30.00	35.40	42.20	47.00	3
25					35.60	41.70	47.50	56.90	0
26					43.00	48.30	53.60	60.50	1
27						54.40	59.70	64.40	0
28						59.90	65.20	69.80	0
Basis	6	38	34	12	10	1	0	1	102

64.24 cu. ft. to one standard cord (50.2%)
Basis - 102 trees. Measured by the Soil Conservation Service.
Volume - all sticks, 4 ft. long, having a middle diameter of 2 in. or more outside bark. Volume by computation - Huber's formula.
Stump 1 ft., not included in volume. Measurements by steel tape.
Aggregate Deviation - Table 0.7% low
Average Percentage Deviation, 25.4%

J. Howell, Jr.

JUNIPERUS SCOPULORUM
(Rocky Mt. Red Cedar)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER IN INCHES AT ONE FOOT AND CROWN WIDTH IN FEET



ROCKY MOUNTAIN RED CEDAR
(Juniperus scopulorum (Sarg.)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER BREAST HEIGHT IN INCHES AND TOTAL HEIGHT IN FEET

Arizona - New Mexico
1938

J. Howell, Jr.

Partial Contents with Bark Cubic Foot

D.B.H. Inches	Total Height - Feet					Basis No. of Trees
	10	15	20	25	30	
	Partial Volume - Cubic Feet					
2	0.14	0.15	0.18			8
3	0.48	0.50	0.53			14
4	0.80	0.81	0.82	0.85		21
5	1.25	1.30	1.40	1.50	1.55	12
6	2.28	2.38	2.50	2.60	2.70	10
7	3.46	3.58	3.64	3.80	4.00	9
8	4.90	5.00	5.10	5.15	5.34	5
9	6.40	6.25	6.45	6.60	6.75	9
10	7.78	8.00	8.15	8.30	8.42	4
11		9.72	9.90	10.00	10.34	5
12		11.78	11.90	12.00	12.20	1
13		13.80	14.00	14.10	14.82	5
14		15.75	16.00	16.10	16.20	1
15			18.40	18.80	19.00	2
16			20.30	20.70	21.00	5
17			22.60	22.80	23.00	1
18			25.00	25.20	25.70	1
19				27.70	26.50	0
20					28.10	0
Basis	10	45	40	16	2	113

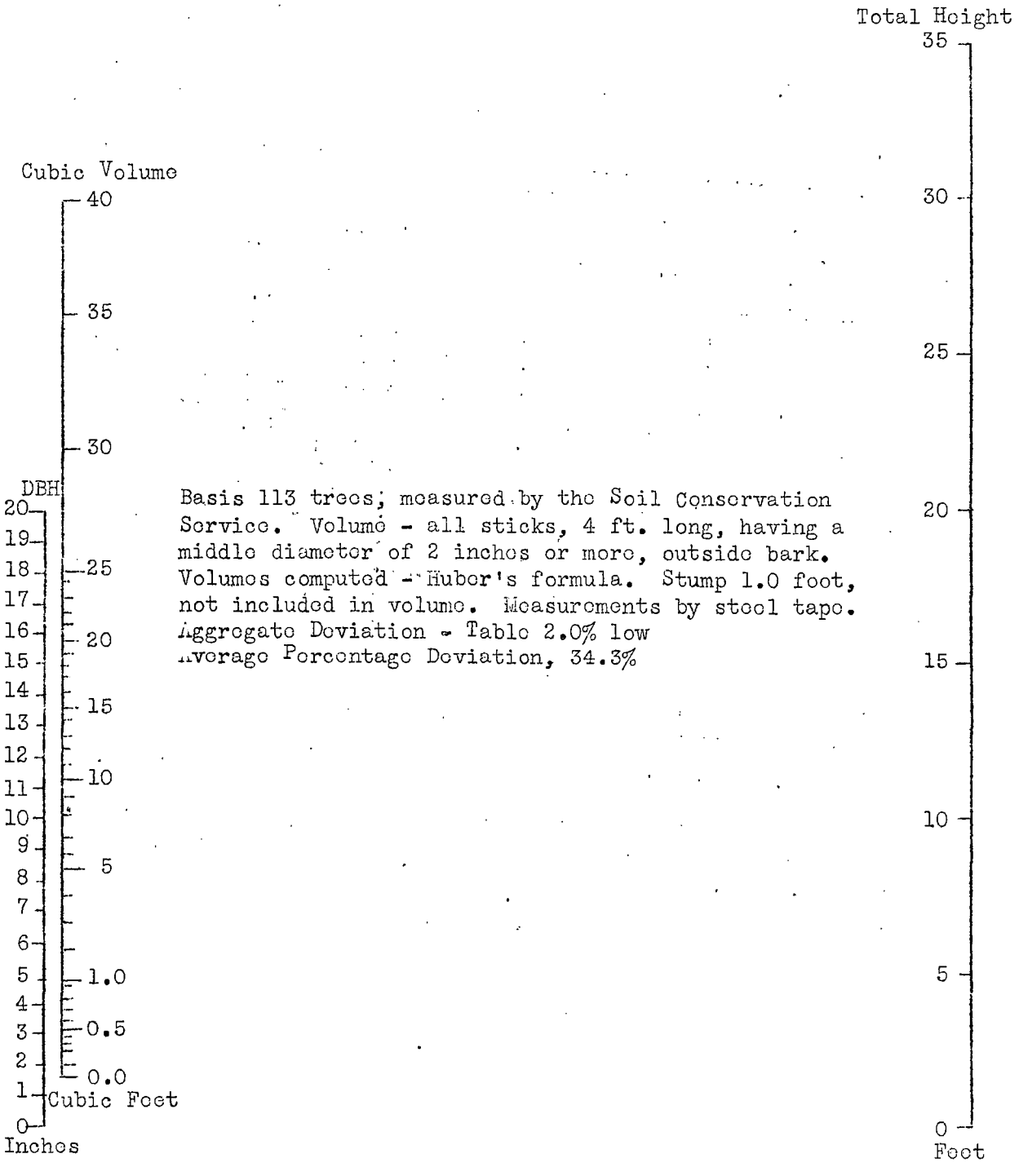
64.24 cu. ft. to one standard cord (50.2%)
Basis - 113 trees. Measured by the Soil Conservation Service.
Volume - all sticks, 4 ft. long, having a middle diameter of 2 in. or more outside bark. Volumes by computation - Huber's formula.
Stump 1.0 ft., not included in volume. Measurements by steel tape.
Aggregate Deviation - Table 2.0% low
Average Percentage Deviation, 34.3%

J. Howell, Jr.

JUNIPERUS SCOPULORUM
(Rocky Mt. Red Cedar)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER BREAST HEIGHT IN INCHES AND TOTAL HEIGHT IN FEET

Arizona - New Mexico
1938



Basis 113 trees, measured by the Soil Conservation Service. Volume - all sticks, 4 ft. long, having a middle diameter of 2 inches or more, outside bark. Volumes computed - Huber's formula. Stump 1.0 foot, not included in volume. Measurements by steel tape.
Aggregate Deviation - Table 2.0% low
Average Percentage Deviation, 34.3%

ROCKY MOUNTAIN RED CEDAR
(Juniperus scopulorum (Sarg.)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET

Arizona - New Mexico
1939

J. Howell, Jr.

Partial Volume with Bark Cubic Feet

D.B.H. Inches	Crown Width - Feet								Basis No. of Trees
	5	10	15	20	25	30	35	40	
	Cubic Volume - Cubic Feet								
2	0.10	0.18	0.35						8
3	0.35	0.48	0.70	1.02					13
4	0.70	0.86	1.20	1.60					20
5	1.23	1.45	1.93	2.40					11
6	1.80	2.08	2.68	3.28	3.92				9
7		3.08	3.67	4.40	5.17				7
8		4.10	4.79	5.63	6.40	7.22			5
9		5.32	5.95	6.80	7.70	8.55			7
10		6.50	7.25	8.12	8.98	9.90	10.92		3
11		7.80	8.73	9.68	10.72	11.84	13.00		4
12		9.25	10.28	11.30	12.65	13.82	15.00	16.65	1
13			12.00	13.28	14.50	15.91	17.16	18.80	1
14			13.90	15.20	16.64	18.00	19.80	23.10	1
15			15.92	17.17	18.88	20.70	25.22	36.15	2
16			18.28	20.00	23.17	29.40	43.10	67.80	4
17				25.80	33.12	49.50	60.50	76.95	1
18					55.00	67.35	79.10	95.00	1
Basis	6	38	34	13	7	3	0	1	102

64.24 cu. ft. to one standard cord (50.2%)
Basis - 102 trees. Measured by the Soil Conservation Service. All sticks, 4 ft. long, having a middle diameter of 2 in. or more outside bark. Volume by computation - Huber's formula. Stump 1 ft., not included in volume. Measurements by steel tape.
Aggregate Deviation - Table 0.7% high
Average Percentage Deviation, 35.3%

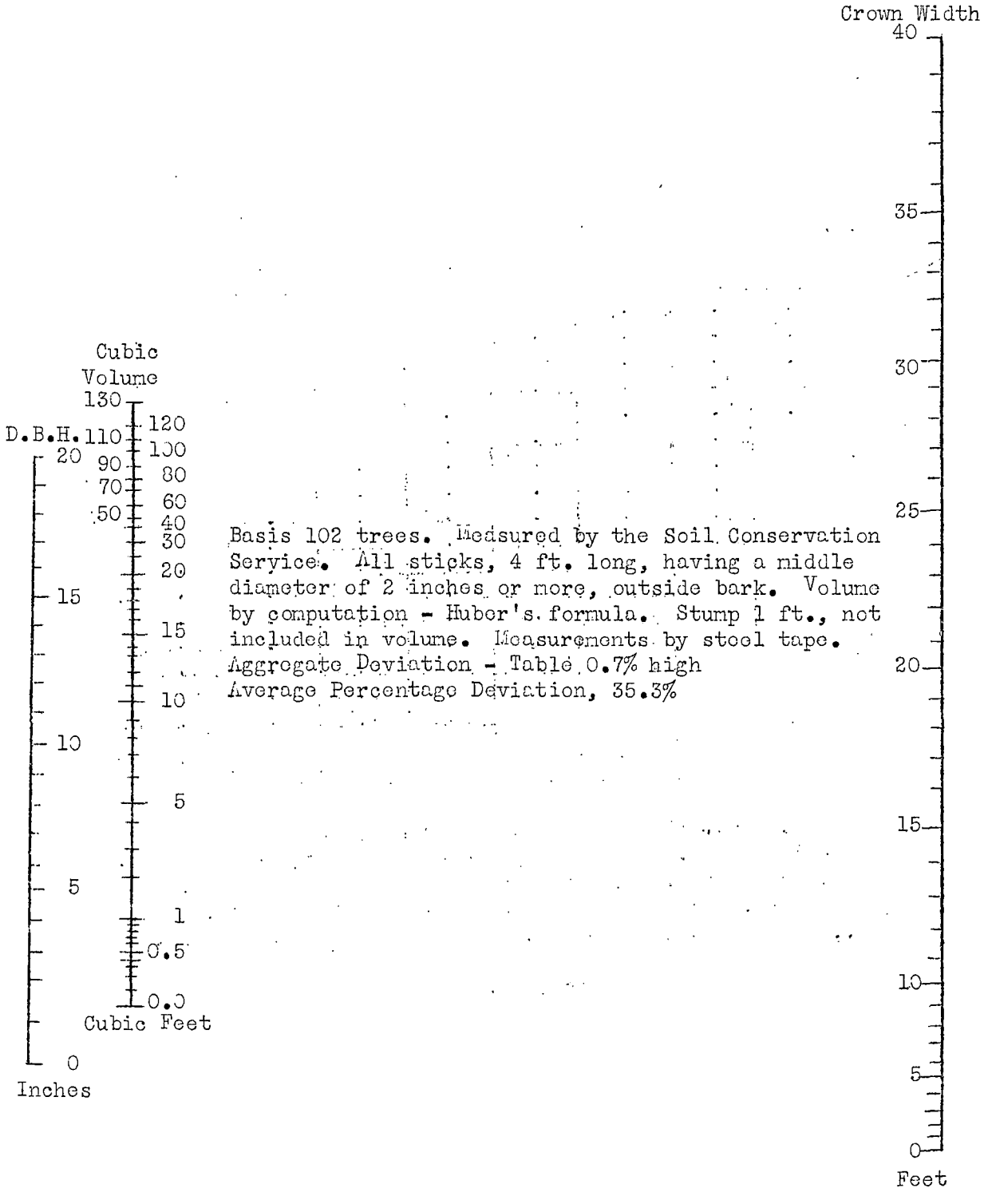
J. Howell, Jr.

JUNIPERUS SCOPULORUM
(Rocky Mt. Red Cedar)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET

Arizona - New Mexico
1939

Partial Volume
with Bark
Cubic Feet



Basis 102 trees. Measured by the Soil Conservation Service. All sticks, 4 ft. long, having a middle diameter of 2 inches or more, outside bark. Volume by computation - Huber's formula. Stump 1 ft., not included in volume. Measurements by steel tape.
Aggregate Deviation - Table 0.7% high
Average Percentage Deviation, 35.3%

ROCKY MOUNTAIN RED CEDAR
(Juniperus scopulorum (Sarg.)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER IN INCHES AT ONE FOOT AND TOTAL HEIGHT IN FEET

Arizona - New Mexico
1939

Partial Contents with Bark Cubic Feet

J. Howell, Jr.

Dia. 1 ft. Inches	Total Height - Feet							Basis No. of Trees
	10	15	20	25	30	35	40	
	Partial Volume - Cubic Feet							
3	0.39	0.09						8
4	0.78	0.37	0.16	0.10				18
5	1.17	0.75	0.50	0.40				30
6	1.74	1.22	0.90	0.86	1.00	1.30		43
7	2.50	1.70	1.37	1.27	1.44	1.78		20
8	3.90	2.45	1.88	1.78	2.00	2.65		19
9	5.30	4.23	3.20	3.00	3.50	4.30		31
10	7.18	5.72	5.00	4.85	5.13	5.80	7.28	19
11		7.45	6.50	6.42	7.00	7.60	9.50	27
12		9.00	8.00	7.88	8.28	9.22	11.40	14
13		11.00	9.45	9.20	9.82	11.38	14.55	11
14		12.82	11.12	11.00	11.78	13.13	16.00	19
15		15.00	13.00	12.62	13.20	15.20	17.90	6
16		16.95	15.00	14.78	15.63	17.00	20.40	8
17		19.00	17.00	16.80	17.57	19.48	24.00	6
18		21.30	18.58	18.40	19.40	22.00	27.20	2
19			20.60	20.40	21.50	24.70	30.58	0
20			23.50	23.30	24.50	28.40	35.00	2
21			26.55	25.75	27.65	31.50	38.22	1
22			30.20	29.90	31.08	35.15	41.35	1
23			33.20	32.90	35.10	40.00	45.00	0
24			37.83	37.40	38.72	42.62	48.20	3
25				40.50	42.00	45.68	51.20	0
26				43.50	44.90	48.72	54.40	1
27						51.50	57.20	0
28							60.00	0
Basis	20	89	68	56	30	22	4	289

64.24 cu. ft. to one standard cord (50.2%)
Basis - 289 trees. Measured by the Soil Conservation Service.
Volume- all sticks, 4 ft. long, having a middle diameter of 2 in. or more, outside bark. Volumes by computation - Huber's formula.
Stump 1.0 ft., not included in volume. Measurements by steel tape.
Aggregate Deviation - Table 0.2% high
Average Percentage Deviation, 52.8%

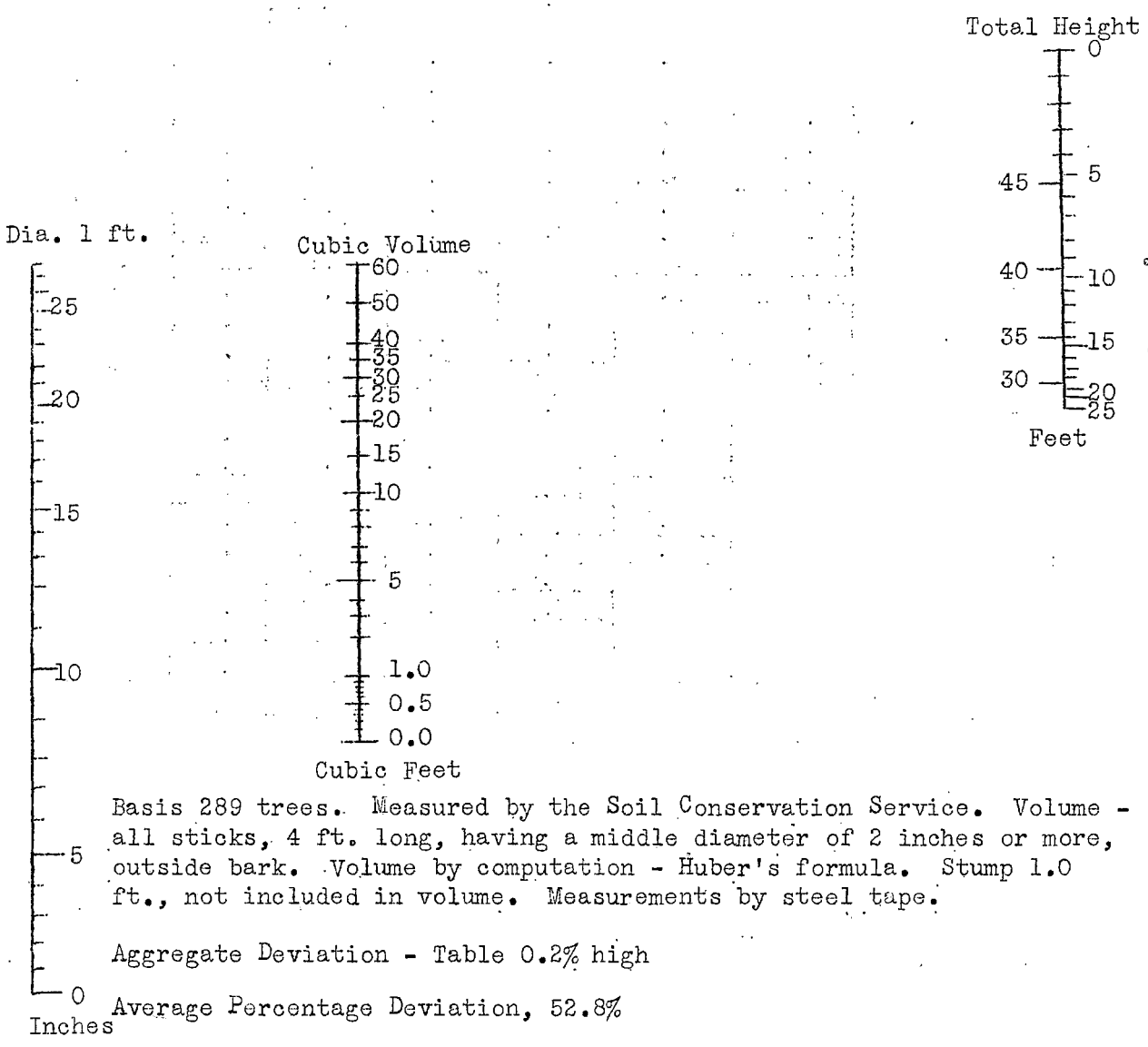
J. Howell, Jr.

JUNIPERUS SCOPULORUM
(Rocky Mt. Red Cedar)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER IN INCHES AT ONE FOOT AND TOTAL HEIGHT IN FEET

Arizona - New Mexico
1939

Partial Contents
with Bark
Cubic Feet



Basis 289 trees. Measured by the Soil Conservation Service. Volume - all sticks, 4 ft. long, having a middle diameter of 2 inches or more, outside bark. Volume by computation - Huber's formula. Stump 1.0 ft., not included in volume. Measurements by steel tape.

Aggregate Deviation - Table 0.2% high

Average Percentage Deviation, 52.8%

ROCKY MOUNTAIN RED CEDAR
(Juniperus scopulorum (Sarg.)

STACKED VOLUME IN CUBIC FEET BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET

Arizona - New Mexico
1939

J. Howell, Jr.

Stacked Volume With Bark Cubic Feet

D.B.H. Inches	Crown Width - Feet								Basis No. of Trees
	5	10	15	20	25	30	35	40	
	Stacked Volume - Cubic Feet								
2	0.05	0.13	0.40						8
3	0.48	0.80	1.17	1.45					13
4	1.23	1.52	1.80	2.10					20
5	1.86	2.20	2.78	3.52					11
6	2.85	3.58	4.45	5.58	7.32				9
7		6.00	7.60	9.50	11.60				7
8		10.00	12.00	13.68	15.35	16.85			5
9		14.00	15.55	16.83	18.22	19.45			7
10		17.12	18.42	19.70	20.75	21.80	22.90		3
11		20.00	21.05	22.18	23.10	24.00	25.00		4
12		22.30	23.22	24.16	26.75	26.94	30.00	32.80	1
13			25.53	28.25	30.00	32.88	35.30	37.83	1
14			30.90	33.50	35.80	38.32	41.00	45.10	1
15			36.00	39.30	42.50	47.50	52.30	57.00	2
16			43.18	48.22	53.30	58.56	66.60	72.50	4
17				60.00	67.80	75.00	84.20	93.20	1
18					86.40	94.50	102.10	110.00	1
Basis	6	38	34	13	7	3	0	1	102

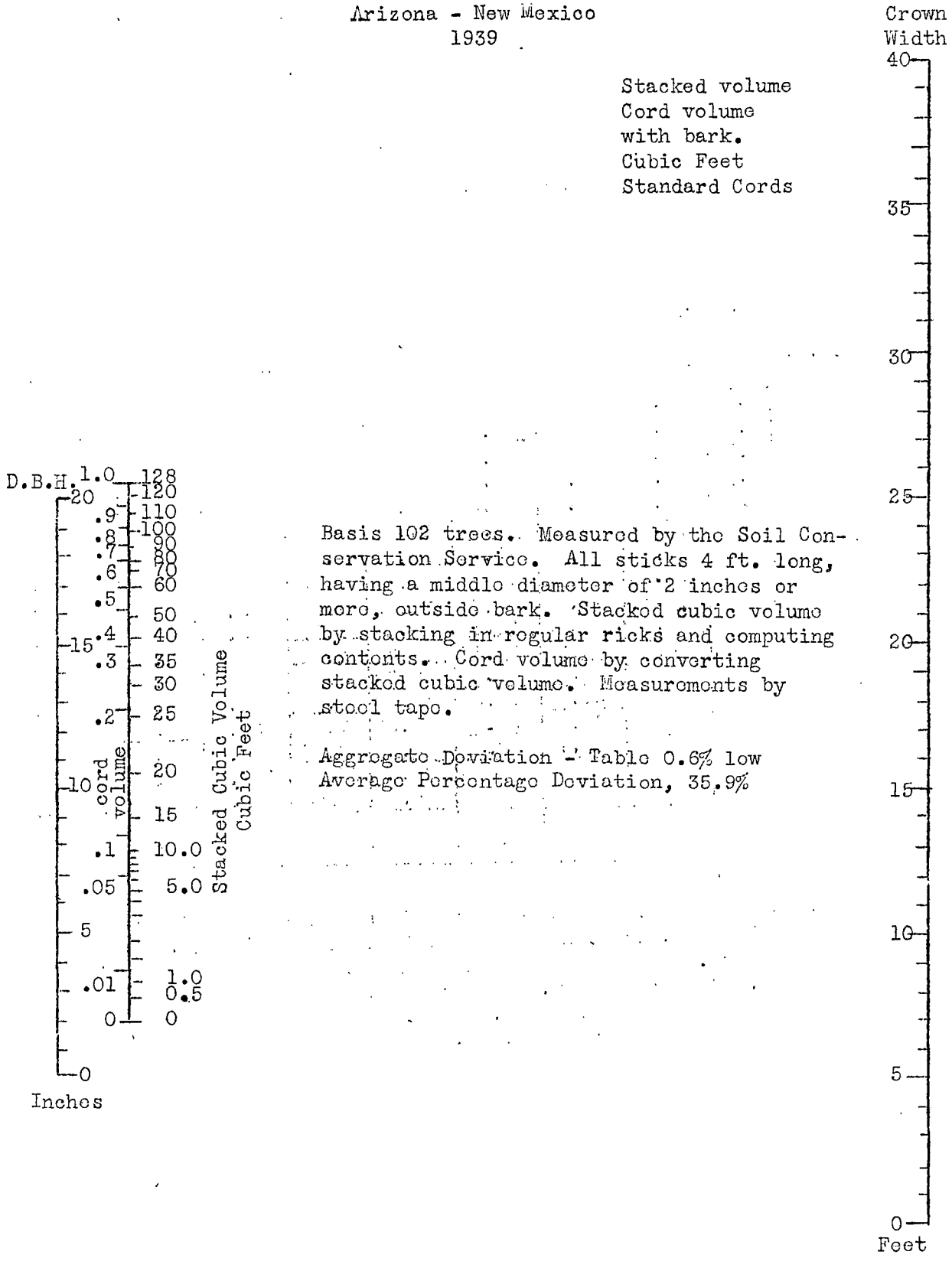
Basis - 102 trees. Measured by the Soil Conservation Service. All sticks 4 ft. long, having a middle diameter of 2 in. or more, outside bark. Volume by stacking in regular ricks and computing contents. Cord wood only. Measurements by steel tape.
Aggregate Deviation - Table 0.6% low.
Average Percentage Deviation, 35.9%

J. Howell, Jr.

JUNIPERUS SCOPULORUM
(Rocky Mt. Red Cedar)

STACKED VOLUME IN CUBIC FEET BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET. PARTIAL VOLUME IN STANDARD CORDS BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET

Arizona - New Mexico
1939



Basis 102 trees. Measured by the Soil Conservation Service. All sticks 4 ft. long, having a middle diameter of 2 inches or more, outside bark. Stacked cubic volume by stacking in regular ricks and computing contents. Cord volume by converting stacked cubic volume. Measurements by steel tape.

Aggregate Deviation - Table 0.6% low
Average Percentage Deviation, 35.9%

ROCKY MOUNTAIN RED CEDAR
(Juniperus scopulorum (Sarg.)

PARTIAL VOLUME IN STANDARD CORDS BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET

Arizona - New Mexico
1939

J. Howell, Jr.

Cord Volume with Bark Standard Cord

D.B.H. Inches	Crown Width - Feet								Basis No. of Trees
	5	10	15	20	25	30	35	40	
	Cord Measure								
2	0.0004	0.0010	0.0031						8
3	0.0038	0.0063	0.0091	0.0113					13
4	0.0096	0.0119	0.0141	0.0264					20
5	0.0145	0.0172	0.0217	0.0275					11
6	0.0223	0.0280	0.0348	0.0436	0.0572				9
7		0.0469	0.0594	0.0742	0.0906				7
8		0.0781	0.0938	0.1069	0.1199	0.1316			5
9		0.1094	0.1215	0.1315	0.1423	0.1520			7
10		0.1338	0.1439	0.1539	0.1621	0.1703	0.1789		3
11		0.1563	0.1645	0.1733	0.1805	0.1875	0.1953		4
12		0.1742	0.1814	0.1888	0.2090	0.2105	0.2344	0.2563	1
13			0.1995	0.2207	0.2344	0.2569	0.2758	0.2955	1
14			0.2414	0.2617	0.2734	0.2994	0.3203	0.3523	1
15			0.2813	0.3070	0.3320	0.3711	0.4086	0.4453	2
16			0.3373	0.3767	0.4164	0.4575	0.5203	0.5664	4
17				0.4688	0.5297	0.5859	0.6578	0.7281	1
18					0.6750	0.7383	0.7976	0.8594	1
Basis	6	38	34	13	7	3	0	1	102

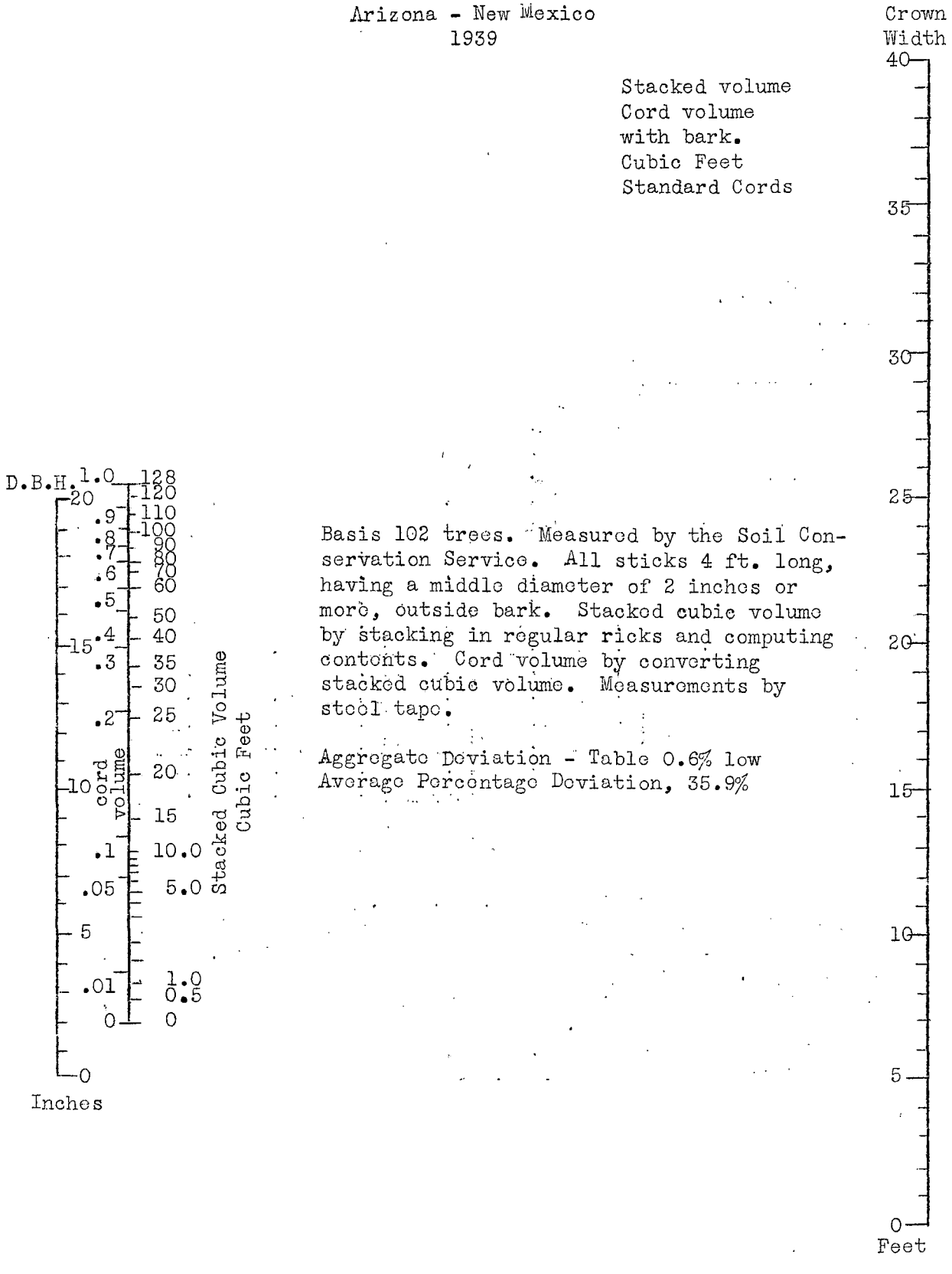
1 standard cord = 64.24 cu. ft. (50.2%)
Basis - 102 trees. Measured by the Soil Conservation Service.
All sticks 4 ft. long, having a middle diameter of 2 in. or more, outside bark. Volume by conversion from stacked cubic volume.
Cubic volume by stacking in regular ricks and computing contents.
Measurements by steel tape.
Aggregate Deviation - Table 0.6% low.
Average Percentage Deviation, 35.9%.

J. Howell, Jr.

JUNIPERUS SCOPULORUM
(Rocky Mt. Red Cedar)

STACKED VOLUME IN CUBIC FEET BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET. PARTIAL VOLUME IN STANDARD CORDS BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET

Arizona - New Mexico
1939



Basis 102 trees. Measured by the Soil Conservation Service. All sticks 4 ft. long, having a middle diameter of 2 inches or more, outside bark. Stacked cubic volume by stacking in regular ricks and computing contents. Cord volume by converting stacked cubic volume. Measurements by steel tape.

Aggregate Deviation - Table 0.6% low
Average Percentage Deviation, 35.9%

ONE-SEED JUNIPER
(Juniperus monosperma (Engelm) Sarg.)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER IN INCHES AT ONE FOOT AND CROWN DIAMETER IN FEET

Arizona - New Mexico
1938

Partial Contents with Bark Cubic Feet

J. Howell, Jr.

Dia. at 1 Ft.	Crown Diameter - Feet							Basis No. of Trees
	5	10	15	20	25	30	35	
	Cubic Volume - Cubic Feet							
2	0.14							1
3	0.16	0.46	0.82					24
4	0.22	0.64	1.10	2.58				46
5	0.37	0.92	1.62	3.20	6.20			56
6	0.55	1.28	2.15	3.90	7.65			74
7	0.76	1.75	2.70	4.70	9.00			59
8	1.10	2.26	3.30	5.70	10.55			76
9	1.51	2.80	4.02	6.80	12.10			78
10	1.98	3.45	4.95	8.05	13.90	21.30	29.20	60
11	2.47	4.20	6.00	9.50	15.60	23.20	31.00	45
12	3.10	5.05	7.10	11.00	17.30	25.50	32.60	45
13	3.75	6.05	8.35	12.55	19.45	27.60	34.20	32
14	4.62	7.30	9.75	14.30	21.35	29.70	35.90	36
15	5.60	8.65	11.25	15.95	23.40	31.80	37.05	30
16	6.70	10.05	13.00	17.90	25.75	33.40	38.90	22
17	7.95	11.70	14.70	19.90	27.90	34.90	40.00	12
18	9.20	13.20	16.30	21.90	30.00	36.25	41.70	7
19	10.80	15.00	18.25	24.10	32.00	37.55	42.70	6
20	12.45	16.90	20.25	26.15	33.50	39.15	44.45	10
21	14.05	18.90	22.30	28.55	35.00	40.45	46.10	3
22	15.70	20.80	24.65	30.80	36.50	42.25	47.00	5
23		23.10	26.90	32.50	37.95	43.75	48.75	5
24		25.05	29.00	34.05	39.50	44.55	49.80	3
25		26.00	31.00	35.45	40.50	46.30	51.25	4
26		30.00	33.00	36.95	42.10	48.00	52.55	1
27			34.30	38.20	43.65	48.75	54.00	3
28			35.60	39.65	44.85	50.15	55.25	1
29			37.50	40.95	46.25	51.45	56.65	1
30			38.90	42.40	47.70	52.85	58.10	0
31			40.00	44.20	48.90	54.30	59.45	0
32			42.00	46.00	50.00	55.70	60.95	2
33			42.80	47.00	51.80	57.00	62.35	0
34			44.00	48.25	53.15	58.55	63.65	2
35				49.30	54.55	59.85	65.00	0
36				50.80	55.85	61.00	66.35	1
37					57.30	62.65	67.70	0
38					58.55	63.95	68.15	0
39						65.35	70.50	1
40						66.75	71.80	0
Basis	100	326	221	68	31	3	2	751

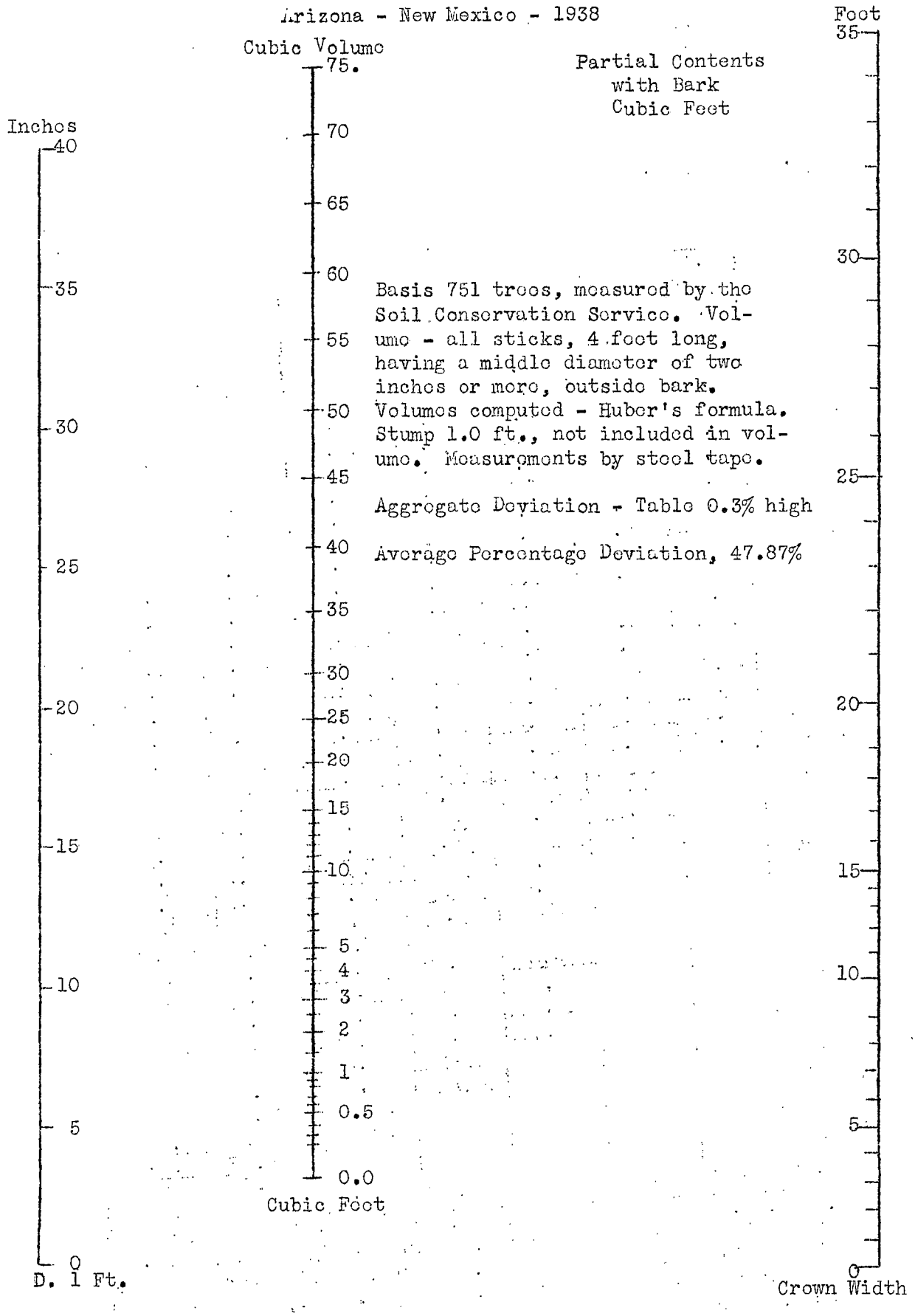
63.7 cu.ft. to 1 standard cord (49.8%) Basis - 751 trees, measured by the Soil Conservation Service. Volume - all sticks, 4 ft. long, having a middle diameter of 2 in. or more, outside bark. Volumes by computation - Huber's formula. Stump 1.0 ft., not included in volume. Measurements by steel tape. Aggregate Deviation - Table 0.3% high. Average Percentage Deviation, 47.87%.

J. Howell, Jr.

JUNIPERUS MONOSPERMA
(One-Seed Juniper)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER IN INCHES AT ONE FOOT AND CROWN DIAMETER IN FEET

Arizona - New Mexico - 1938



ONE-SEED JUNIPER
(Juniperus monosperma (Engelm) Sarg.)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET

Arizona - New Mexico
1938

J. Howell, Jr.

Partial Contents with Bark Cubic Feet

D.B.H. Inches	Crown Width - Feet: 5	10	15	20	25	30	35	Basis No. of Trees
	Partial Volume - Cubic Feet							
1	0.60	1.00	2.25					9
2	0.71	1.40	2.88					45
3	1.00	1.85	3.52	6.70				70
4	1.45	2.35	4.30	7.90				80
5	1.82	2.90	5.10	9.15	17.10			63
6	2.30	3.47	5.90	10.40	18.80			62
7	2.70	4.00	6.80	11.60	20.60	35.25		50
8	3.10	4.62	7.65	12.80	22.60	36.90		56
9	3.50	5.20	8.40	14.00	24.75	38.70	55.00	43
10	3.92	5.78	9.20	15.25	26.20	40.00	56.50	22
11	4.40	6.35	10.00	16.50	28.00	41.30	57.20	22
12	4.82	6.90	10.60	17.80	30.00	43.40	59.00	16
13	5.30	7.50	11.60	19.00	31.40	45.00	60.00	13
14	5.70	8.10	12.60	20.00	32.70	46.30	61.60	7
15		8.70	13.60	21.15	34.15	48.25	62.60	7
16		9.30	14.60	22.65	35.50	50.00	64.10	5
17		9.90	15.60	24.10	36.30	50.60	65.00	2
18		10.25	16.60	25.00	37.70	51.90	66.40	5
19			17.35	26.90	38.70	53.20	67.40	2
20			18.35	28.00	40.00	54.30	68.70	1
21			19.30	30.00	41.30	55.50	70.00	0
22			20.40	30.60	42.40	56.50	71.10	1
23				31.70	43.75	57.80	72.00	0
24				33.30	45.15	59.00	72.80	1
25					46.30	60.00	73.80	0
26					47.50	60.50	74.60	0
27						61.60	75.20	0
28						62.70	76.10	0
29							77.20	0
30							78.10	1
Basis	71	250	176	56	25	2	3	583

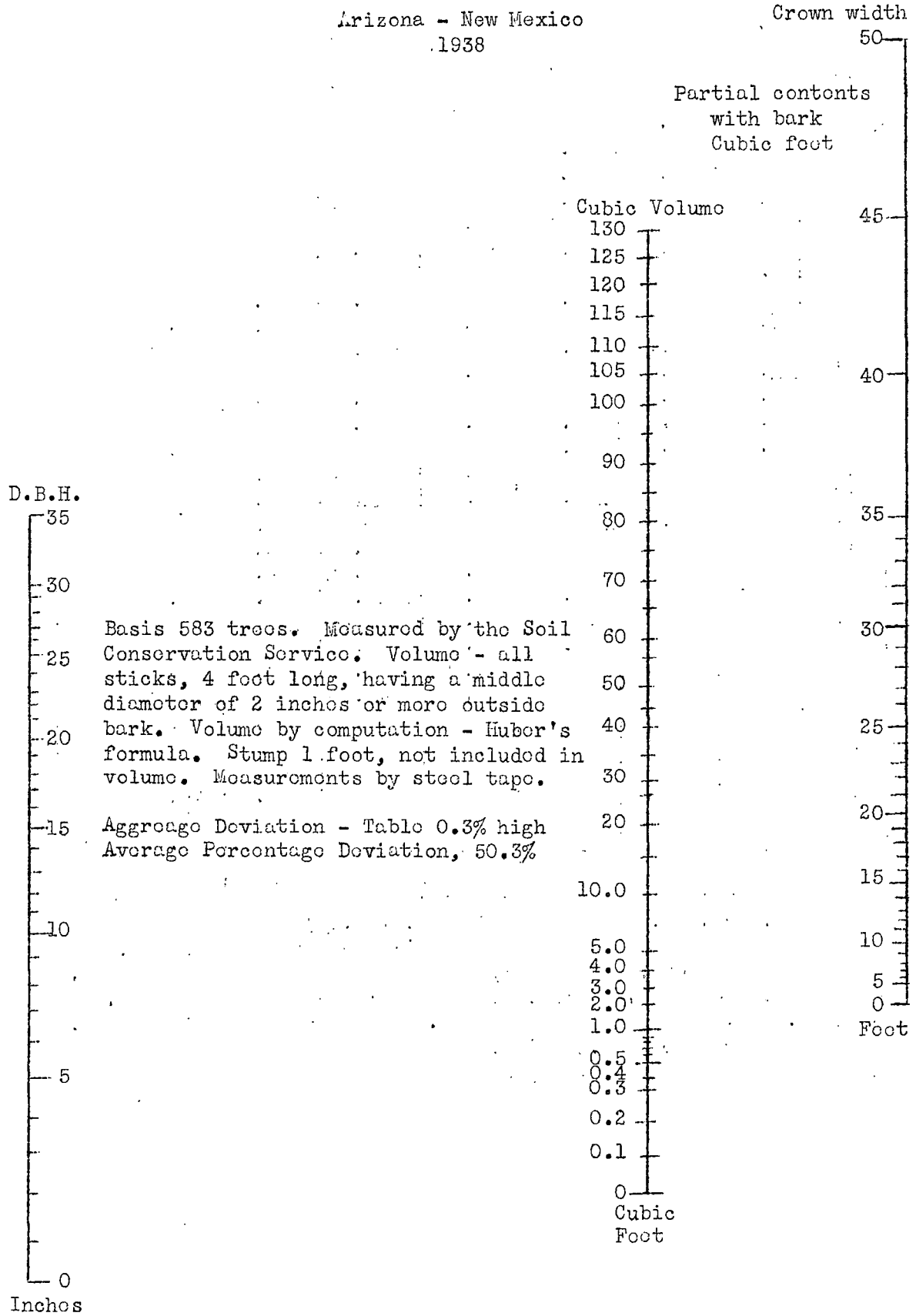
63.7 cu. ft. to 1 standard cord. (49.8%)
Basis - 583 trees. Measured by the Soil Conservation Service.
Volume - all sticks, 4 ft. long, having a middle diameter of 2 in. or more outside bark. Volume by computation - Huber's formula.
Stump 1.0 ft. not included in volume. Measurements by steel tape.
Aggregate Deviation - 0.3% high.
Average Percentage Deviation, 50.3%

J. Howell, Jr.

JUNIPERUS MONOSPERMA
(One-Seed Juniper)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER BREAST HEIGHT IN INCHES AND CROWN WIDTH IN FEET

Arizona - New Mexico
1938



Basis 583 trees. Measured by the Soil Conservation Service. Volume - all sticks, 4 foot long, having a middle diameter of 2 inches or more outside bark. Volume by computation - Huber's formula. Stump 1 foot, not included in volume. Measurements by steel tape.

Aggregate Deviation - Table 0.3% high
Average Percentage Deviation, 50.3%

ONE-SEED JUNIPER
(Juniperus monosperma, (Engelm) Sarg.)

TOTAL VOLUME OF BRUSH IN CUBIC FEET BASED ON
CROWN WIDTH IN FEET AND CROWN LENGTH IN FEET

Arizona - New Mexico
1939

J. Howell, Jr.

Total Volume of Brush

Crown Width Feet	Crown Length - Feet: 5	10	15	20	25	30	35	Basis No. of Trees
	Total Volume of Brush - Cubic Feet							
6	2.5	5.6	11.8	17.5				48
8	11.3	15.3	23.5	33.0	40.0			-
10	20.6	25.8	38.8	52.0	64.5			169
12	31.0	39.0	57.0	76.0	90.0			-
14	42.1	51.3	75.0	90.0	96.7	100.0		-
16	56.5	72.3	90.0	100.0	106.5	115.0	126.0	132
18	84.0	92.0	110.0	117.7	128.5	140.0	152.0	-
20	102.6	112.5	134.0	153.5	178.0	205.0	248.0	42
22		134.0	166.0	200.0	232.5	257.0	324.0	-
24		150.0	200.0	237.8	272.0	315.0	380.0	20
26		170.0	230.0	272.5	322.0	370.0	440.0	-
28			263.0	320.0	384.0	440.0	500.0	-
30			297.0	365.0	450.0	505.0	555.0	1
32			350.0	460.0	537.5	590.0	618.0	-
34			420.0	532.0	600.0	652.0	700.0	1
36			480.0	600.0	660.0	722.0	760.0	1
38				637.0	715.0	750.0	812.0	-
40				690.0	750.0	812.0	870.0	-
42					850.0	900.0	948.0	-
44					940.0	995.0	1050.0	-
46					1064.0	1125.0	1160.0	-
48						1225.0	1250.0	-
50						1302.0	1350.0	-
52						1425.0	1480.0	-
54						1550.0	1610.0	-
56						1712.0	1760.0	1
58							1950.0	-
60							2015.0	-
Basis	12	151	173	58	13	6	2	415

Basis - 415 trees. Measured by the Soil Conservation Service. Total volume of brush removed from trees. Measurements with steel tape. Volume by computation. Brush stacked in piles for measurement.
Aggregate Deviation - Table 1.7% high.
Average Percentage Deviation, 57.5%.

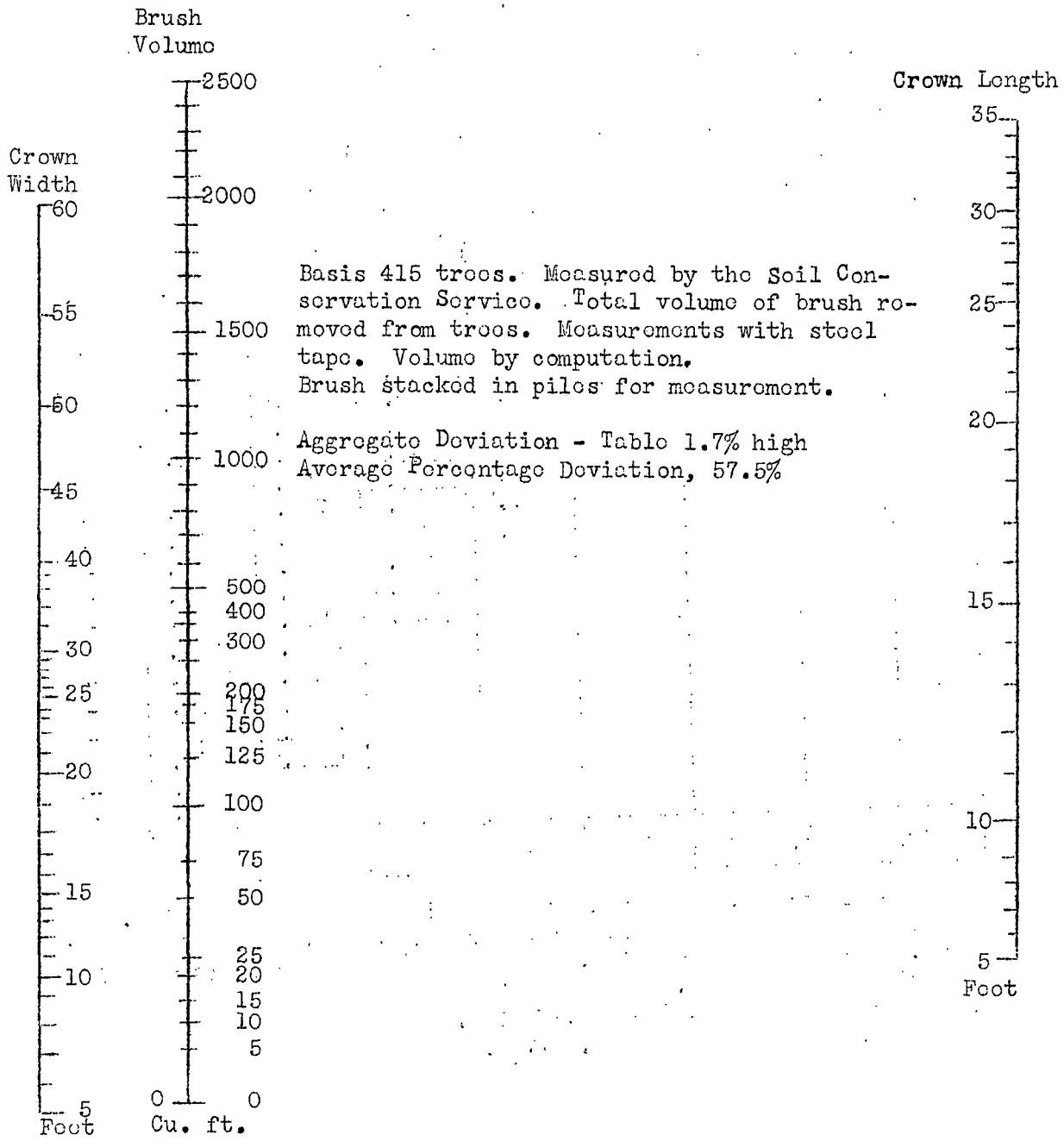
J. Howell, Jr.

JUNIPERUS MONOSPERMA
(One-Seed Juniper)

TOTAL VOLUME OF BRUSH IN CUBIC FEET BASED ON CROWN WIDTH IN FEET AND CROWN LENGTH IN FEET

Arizona - New Mexico
1939

Total Volume of Brush



Basis 415 trees. Measured by the Soil Conservation Service. Total volume of brush removed from trees. Measurements with steel tape. Volume by computation.
Brush stacked in piles for measurement.

Aggregate Deviation - Table 1.7% high
Average Percentage Deviation, 57.5%

#1246

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
REGION 8

Albuquerque, New Mexico,
November 9, 1939.

Attached is Supplement No. 1 to Regional Bulletin No. 59, Woodland Series No. 8. These supplements will be issued from time to time and it is suggested that they be kept with the original bulletin.

VOLUME TABLE FOR PINUS EDULIS (PINON)*

by

Joseph Howell, Jr.**

and

Bert Lexen***

Pinon (Pinus edulis Engelm.) is found throughout the Southwest in pure stands or in mixtures with one-seed juniper (Juniperus monosperma (Engelm.) Sarg.), Rocky Mountain red cedar (Juniperus scopulorum, Sarg.) and ponderosa pine (Pinus ponderosa, Laws.). The wood of this species is widely used for fuel, mine props, mine ties, fencing, and charcoal, and is occasionally sawn into lumber. The junipers are preferred for fuel as the pinon, when burning, gives off a pitchy, sooty smoke that soon clogs the flues and chimneys.

This pinon exerts a little more effort to form a tree than the juniper, but still may exhibit a sprawling, bushy habit. Trees that have developed in the relatively dense stands are usually single stemmed with a more or less straight trunk and few large side branches while, on the other hand, the open grown tree represents to some extent an old orchard tree. The crown is usually rounded and spreading, being made up of many small and large, crooked branches. The main trunk is short, breaking up into a number of large stems or branches.

The sample trees selected for study were measured in a manner similar to that for one-seed juniper and Rocky Mountain red cedar.

The relationship between diameter breast height and total height with cubic volume was poor and unsatisfactory, whereas correlation between diameter breast height, number of four foot pieces and cubic volume was high and significant. Therefore, an alignment chart was made, using diameter at breast height, number of four foot pieces and cubic volume.

To convert the cubic volume to cords, use 66.54 solid cubic feet to one standard cord. A standard cord contains 52.0% of solid wood. The 584 trees cut yielded 56.95 cords of wood and averaged 0.098 cords of wood per tree. Single trees contained as much as three standard cords of wood.

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* This work was performed under a cooperative agreement between the Soil Conservation Service and the Forest Service.

** Assistant Regional Forester, Southwest Region, Soil Conservation Service, Albuquerque, N. M.

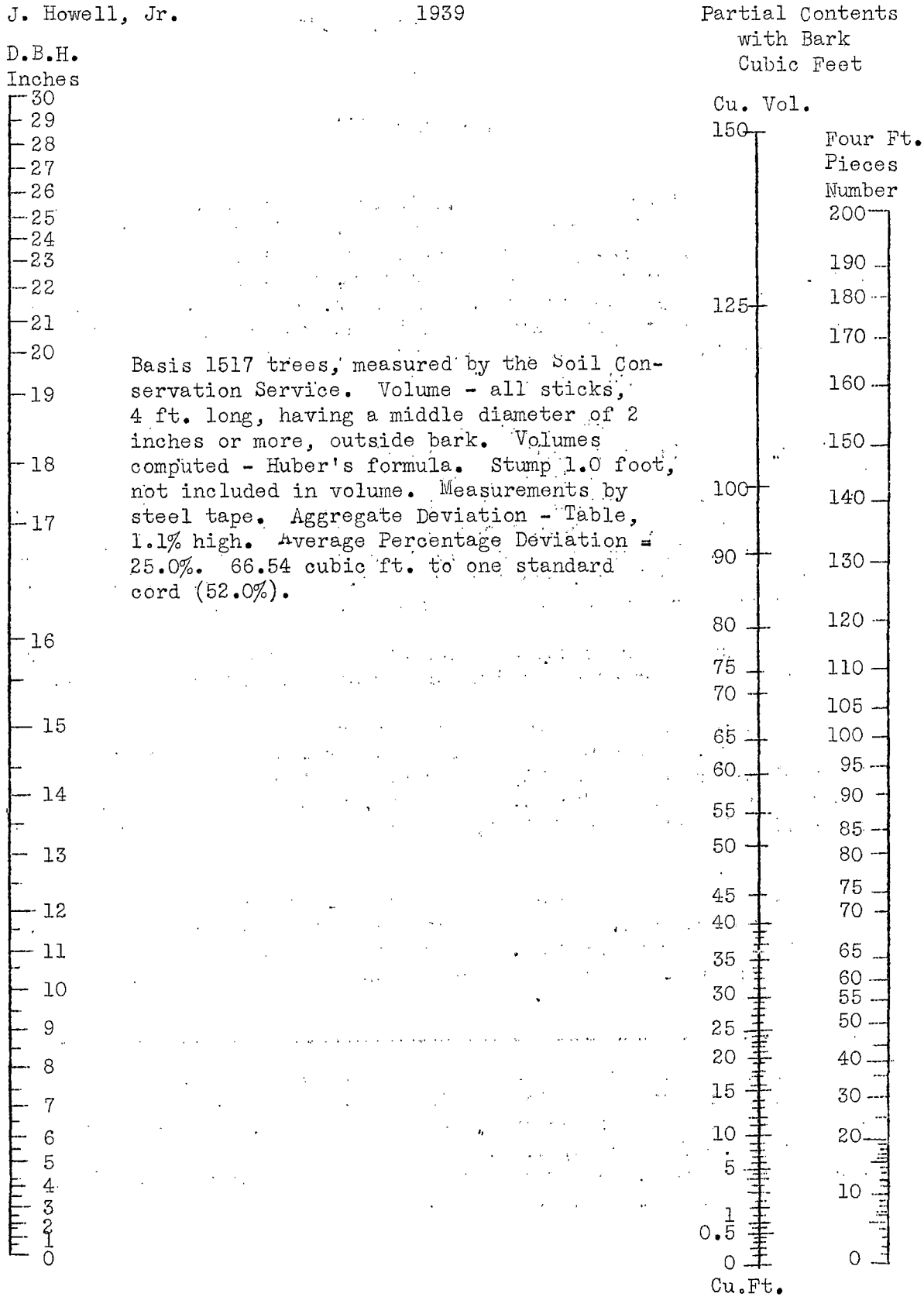
*** Silviculturist, Southwest Forest and Range Experiment Station, Forest Service, Tucson, Arizona.

PINUS EDULIS
(Pinon)

PARTIAL VOLUME IN CUBIC FEET BASED ON DIAMETER IN INCHES AT BREAST HEIGHT AND NUMBER OF FOUR-FOOT PIECES

Arizona - New Mexico

J. Howell, Jr. 1939



Pinon
(Pinus edulis Engelm.)
Partial Volume in Cubic Feet Based on Diameter
In Inches at Breast Height and Number of Four-foot Pieces
Arizona - New Mexico
1939

J. Howell, Jr.

Partial Contents with Bark Cubic Feet

D.B.H. Inches	Number of 4-foot Pieces																			Basis No. of Trees
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Partial Volume - Cubic Feet																			
1	0.14	0.27	0.48	0.70	0.95	1.45														5
2	0.18	0.35	0.55	0.80	1.05	1.55	1.80													58
3	0.22	0.42	0.70	0.95	1.25	1.65	2.00	2.25	2.60									6.00		76
4	0.28	0.48	0.84	1.15	1.50	1.95	2.22	2.50	2.80	3.00								6.50	7.10	8.25	101
5	0.41	0.60	1.00	1.45	1.80	2.10	2.50	2.80	3.10	3.35	3.75	4.00	4.80	5.50	5.70	6.00	6.40	7.10	8.45	9.00	132
6	0.48	0.77	1.28	1.70	2.00	2.38	2.78	3.00	3.35	3.60	4.00	4.50	5.25	5.70	6.00	6.50	7.00	8.00	9.00	9.50	149
7		0.98	1.54	1.95	2.30	2.78	3.15	3.35	3.65	4.00	4.35	5.05	5.85	6.20	7.00	7.75	8.25	9.10	9.75	10.10	142
8		1.25	2.00	2.35	2.60	3.15	3.50	3.80	4.25	4.60	5.30	5.70	6.25	7.00	8.10	8.90	9.10	9.75	10.40	10.70	131
9		1.68	2.20	2.65	3.05	3.50	3.95	4.15	5.00	5.00	5.80	6.30	7.10	8.50	9.20	9.80	10.00	10.40	11.00	11.30	113
10				3.00	3.50	4.00	4.60	4.95	5.60	5.65	6.50	7.00	8.45	9.35	9.95	10.30	10.55	11.10	11.70	12.10	118
11					4.00	4.60	5.25	5.50	6.00	6.60	8.00	8.45	9.50	10.05	10.60	11.00	11.35	11.90	12.30	12.90	69
12					4.50	5.50	6.00	6.20	7.10	8.20	9.00	9.30	10.30	11.00	11.30	11.70	12.00	12.65	13.00	13.60	44
13						6.10	7.00	7.80	9.00	9.30	10.00	10.50	11.15	12.00	12.65	12.95	13.00	13.50	14.00	14.50	23
14						7.60	8.60	9.30	10.00	10.40	11.00	11.65	12.35	13.00	13.35	13.70	14.00	14.80	15.20	16.00	19
15							10.00		11.20	12.00	12.65	13.00	13.50	14.10	14.80	15.00	15.50	16.40	17.00	17.65	5
16							11.15				13.90	14.40	15.00	16.00	16.35	17.00	17.20	18.10	18.95	19.40	2
17											16.20	16.90	17.85	18.70	19.25	19.10	20.00	21.10	21.75	22.15	3
18											17.15	18.00	19.00	20.00	20.50	21.00	21.35	22.50	23.50	24.10	1
19																			25.35	25.90	
20																					
Basis	93	93	121	99	97	83	77	56	53	52	44	51	35	37	30	49	30	33	30	28	1193

Basis 1517 trees, measured by the Soil Conservation Service. Volume-all sticks, 4 ft. long, having a middle diameter of 2 inches or more, outside bark. Volumes computed-Huber's formula. Stump 1.0 foot, not included in volume. Measurements by steel tape. Aggregate Deviation - Table 1.1% high. Average Percentage Deviation = 25.0%. 66.54 cubic feet to one standard cord (52.0%).

D.B.H. Inches	Number of 4-foot Pieces																				Basis No. of Trees
	22	24	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	
	Partial Volume - Cubic Feet																				
5	9.20	10.80	13.00																		0
6	10.00	11.10	13.50	17.65	23.00																1
7	10.55	11.70	14.10	18.50	24.00																10
8	11.15	12.65	14.90	19.20	25.00	30.10															7
9	11.90	13.00	15.60	20.00	26.00	31.00	39.00	46.00	52.60												16
10	12.50	13.70	16.40	21.10	26.75	31.70	40.00	46.80	53.80	59.40	67.50										16
11	13.25	14.35	17.50	22.52	27.80	32.60	40.90	47.30	54.60	60.00	68.10	75.00									34
12	14.00	15.20	18.50	23.40	28.90	33.40	41.90	48.20	55.10	60.90	68.70	76.20	81.45								45
13	15.00	16.40	19.90	25.00	30.00	34.70	43.30	49.00	56.10	62.20	69.50	77.20	82.75								48
14	16.35	18.00	21.20	26.25	31.10	36.00	45.00	50.10	57.20	63.65	71.00	78.10	84.00	91.25							48
15	18.00	19.40	23.40	28.00	32.75	37.50	46.00	51.35	58.40	65.30	73.50	79.15	85.60	93.00							36
16	20.00	21.75	25.50	30.00	34.20	39.20	47.45	54.00	60.00	67.00	76.70	80.65	87.50	94.70							20
17	23.40	25.00	28.45	32.50	37.15	42.20	49.20	56.40	62.60	68.80	78.50	83.15	90.00	97.00	103.90						17
18	24.90	26.10	29.80	33.70	38.30	43.40	50.10	57.40	64.15	69.60	79.15	84.40	91.30	98.60	105.00						11
19			31.10	35.30	40.00	45.20	51.80	58.75	66.00	71.20	80.70	86.00	92.75	100.00	106.60	113.45					4
20				36.10	40.70	45.90	52.90	59.40	66.65	73.50	81.30	86.85	93.80	100.90	107.50	114.30					3
21					41.30	46.35	53.95	60.00	67.10	75.00	81.90	87.70	94.20	101.50	107.80	115.50	122.00				3
22					42.35	46.85	55.00	60.80	67.70	75.90	82.70	88.10	95.00	102.30	108.70	116.00	122.80				4
23						47.45	55.30	61.20	68.00	76.50		88.95	95.40	103.00	109.00	116.50	123.30	127.50			0
24							55.70	61.70	68.30	76.90			95.80	103.70	109.75	117.00	123.80	128.00			1
25							56.00	62.15	68.60					104.00	110.40	117.60	124.20	128.50	132.00		0
26							56.75	62.70	69.00						110.95	118.20	125.00	129.10	132.60		1
27							57.10	64.10								118.70	125.50	129.70	133.00	140.30	0
28																119.10	125.90	130.10	133.50	140.70	0
29																	126.30	130.60	134.50	141.50	1
30																	126.90	131.20	134.50	142.00	0
Basis	48	23	125	64	24	16	7	3	6	4	4	0	0	1	0	0	0	1	0	0	326

#1246

Stuart R. Andrews
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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
REGION 8

Albuquerque, New Mexico
September 23, 1940

Attached is Supplement No. 2 to Regional Bulletin No. 59, Woodland Series No. 8. These supplements will be issued from time to time and it is suggested that they be kept with the original bulletin.

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EXPERIMENT STATION

#1847a

Albuquerque, New Mexico
October 22, 1940

Please note the following correction to Supplement No. 2 to Regional Bulletin No. 59, Woodland Series No. 8, issued October 5, 1939 by the Soil Conservation Service, Albuquerque, New Mexico.

Under the first table, One-Seed Juniper, the heading should read: "Cord Volume Based on Diameter at One Foot in Inches and Crown Width in Feet".

ONE-SEED JUNIPER

(Juniperus monosperma (Engelm). Sarg.)

Cord Volume Based on Diameter at One Foot in ~~Makes~~ Inches and Crown Width in Feet.

Arizona-New Mexico

J. Howell, Jr. 1940

Cord Volume With Bark Stand Cords

Dia. at One Foot Inches	Crown Width-Feet							Basis No. of Trees
	5	10	15	20	25	30	35	
	Cord-Standard							
2	0.0090	0.0130	0.0219	0.0321				54
3	0.0131	0.0196	0.0256	0.0492				69
4	0.0177	0.0264	0.0454	0.0656	0.0961			78
5	0.0238	0.0356	0.0609	0.1004	0.1402			63
6	0.0301	0.0455	0.0860	0.1336	0.1796			61
7	0.0375	0.0563	0.1101	0.1692	0.2214			48
8	0.0469	0.0727	0.1405	0.2070	0.2757	0.4050		55
9	0.0524	0.0860	0.1582	0.2267	0.3125	0.4605		43
10	0.0581	0.1003	0.1900	0.2640	0.3710	0.5280	0.5970	22
11	0.0637	0.1115	0.1953	0.2913	0.4165	0.5705	0.6560	22
12	0.0719	0.1230	0.2167	0.3202	0.4595	0.6250	0.7150	16
13	0.0820	0.1329	0.2254	0.3455	0.4845	0.6560	0.7500	13
14	0.0915	0.1437	0.2365	0.3780	0.5230	0.7035	0.8050	7
15	0.1008	0.1547	0.2658	0.4182	0.5505	0.7580	0.8480	7
16		0.1663	0.2813	0.4540	0.5900	0.8045	0.8990	5
17		0.1812	0.3122	0.4955	0.6410	0.8515	0.9535	2
18		0.1933	0.3400	0.5253	0.6950	0.8950	0.9960	5
19		0.2128	0.3905	0.5780	0.7690	0.9850	1.095	2
20		0.2320	0.4300	0.6340	0.8210	1.048	1.172	0
21			0.4925	0.7110	0.8950	1.172	1.273	1
22			0.5590	0.8050	0.9960	1.272	1.438	1
23			0.5855	0.8350	1.039	1.368	1.504	0
24			0.6295	0.8910	1.090	1.406	1.600	1
25			0.6555	0.9190	1.132	1.466	1.670	0
26				0.9450	1.189	1.522	1.734	0
27				0.9830	1.220	1.594	1.798	0
28				1.017	1.250	1.663	1.850	0
29				1.043	1.305	1.733	1.929	0
30				1.071	1.343	1.767	2.009	1
31					1.407	1.852	2.087	0
32					1.469	1.930	2.185	0
33					1.483	1.954	2.209	0
34					1.524	2.008	2.265	0
35					1.548	2.023	2.295	0
Basis	69	246	176	56	24	2	3	576

Basis 576 trees, measured by the S.C.S. Volume- all sticks, 4 feet long, having a middle diameter of 2 inches or more, outside bark. Volume by stacking in regular ricks and computing contents. Cordwood only. Cord volume by converting stacked cubic volume.aggregate deviation- Table 0.2% low. Average percentage deviation, 49.3%.

ONE-SEED JUNIPER
(Juniperus monosperma (Engelm). Sarg.)

Stacked Volume in Cubic Feet Based on Diameter at One Foot in Inches and Crown Width in Feet

J. Howell, Jr. — Arizona-New Mexico 1940 — Stacked Volume With Bark Cubic Feet

Dia. at One Foot Inches	Crown Width-Feet 5	10	15	20	25	30	35	Basis No. of Trees
	Stacked Volume-Cubic Feet							
2	1.15	1.66	2.80	4.10				54
3	1.68	2.51	3.27	6.30				69
4	2.27	3.38	5.80	8.40	12.30			78
5	3.05	4.55	7.90	12.85	17.95			63
6	3.86	5.83	11.00	17.10	23.00			61
7	4.80	7.20	14.10	21.65	28.30			48
8	6.00	9.30	18.00	26.50	35.25	51.80		55
9	6.70	11.00	20.25	29.00	40.00	59.00		43
10	7.45	12.85	24.30	33.80	47.50	67.50	76.50	22
11	8.15	14.25	25.00	37.25	53.30	73.00	84.00	22
12	9.20	15.75	27.75	41.00	58.80	80.00	91.50	16
13	10.50	17.00	28.80	44.20	62.00	84.00	96.00	13
14	11.70	18.40	30.30	48.40	67.00	90.00	103.00	7
15	12.90	19.80	33.50	53.50	70.50	97.00	108.50	7
16		21.30	36.00	58.00	75.50	103.00	115.00	5
17		23.20	40.00	63.50	82.00	109.00	122.00	2
18		24.75	43.50	67.20	89.00	114.50	127.50	5
19		27.20	50.00	74.00	98.50	126.00	140.00	2
20		29.70	55.00	81.00	105.00	134.00	150.00	0
21			63.00	91.00	114.50	150.00	163.00	1
22			71.50	103.00	127.50	163.00	184.00	1
23			75.00	107.00	133.00	175.00	192.50	0
24			80.50	114.00	139.50	180.00	200.50	1
25			84.00	117.50	145.00	187.50	215.00	0
26				121.00	152.00	195.00	222.00	0
27				126.00	156.00	204.00	230.00	0
28				130.00	160.00	213.00	237.00	0
29				133.50	167.00	222.00	247.00	0
30				137.00	172.00	226.00	257.00	1
31					180.00	237.00	267.50	0
32					188.00	247.00	280.00	0
33					190.00	250.00	283.00	0
34					195.00	257.00	290.00	0
35					198.00	259.00	294.00	0
Basis	69	246	176	56	24	2	3	576

Basis 576 trees, measured by the S.C.S. Volume- all sticks, 4 foot long, having a middle diameter of 2 inches or more, outside bark. Volume by stacking in regular ricks and computing contents. Cordwood only. Measurements by steel tape. aggregate deviation table 0.2% low. Average percentage deviation, 49.3%.

ROCKY MOUNTAIN RED CEDAR
(Juniperus scopulorum (Sarg.)

Stacked Volume in Standard Cords Based on Diameter at One Foot in Inches and Crown Width in Feet

J. Howell, Jr. — Arizona-New Mexico 1940 — Stacked Volume With Bark Cords

Dia. at One Foot Inches	Crown Width- Foot								Basis No. of Trees
	5	10	15	20	25	30	35	40	
	Cord Measure								
3	0.0006	0.0016	0.0065						8
4	0.0045	0.0072	0.0143						6
5	0.0059	0.0084	0.0168	0.0205					16
6	0.0073	0.0099	0.0196	0.0234					16
7	0.0104	0.0155	0.0259	0.0324					5
8	0.0134	0.0182	0.0319	0.0516					8
9		0.0207	0.0402	0.0699					8
10		0.0245	0.0687	0.1057	0.1530				3
11		0.0278	0.0922	0.1232	0.1767				3
12		0.0297	0.1053	0.1290	0.1960				3
13		0.0336	0.1157	0.1368	0.2225	0.2718			4
14		0.0398	0.1270	0.1465	0.2500	0.2960			7
15		0.0500	0.1349	0.1547	0.2736	0.3221			2
16			0.1406	0.1610	0.2892	0.3448			3
17			0.1484	0.1779	0.3047	0.3750	0.4415		3
18			0.1563	0.1951	0.3190	0.4064	0.4689		0
19			0.1618	0.2085	0.3419	0.4297	0.5007		0
20				0.2202	0.3520	0.4550	0.5273	0.5690	2
21				0.2300	0.3855	0.4766	0.5545	0.5977	1
22				0.2533	0.4260	0.5213	0.5938	0.6326	0
23				0.2735	0.4580	0.5624	0.6315	0.6815	0
24				0.2893	0.4847	0.5938	0.6640	0.7187	3
25				0.3087	0.5310	0.6285	0.7190	0.7658	0
26					0.5525	0.6500	0.7420	0.7965	1
27					0.6200	0.7030	0.8008	0.8592	0
28						0.7814	0.8750	0.9568	0
29						0.8240	0.9300	1.0000	0
30							0.9725	1.0550	0
Basis	6	39	34	11	8	3	0	1	102

Basis- 102 trees. Measured by the S.C.S. All sticks 4 feet long, having a middle diameter of 2 inches or more, outside bark. Volume by conversion from stacked cubic volume. Cubic volume by stacking in regular ricks and computing contents. Aggregate deviation- Table 1.9% high. Average percentage deviation, 30.5%.

ROCKY MOUNTAIN RED CEDAR
(Juniperus scopulorum (Sarg.)

Stacked Volume in Cubic Feet Based on Diameter at One Foot in Inches and Crown Width in Feet

J. Howell, Jr. — Arizona-New Mexico — 1940 — Stacked Volume With Bark Cubic Feet

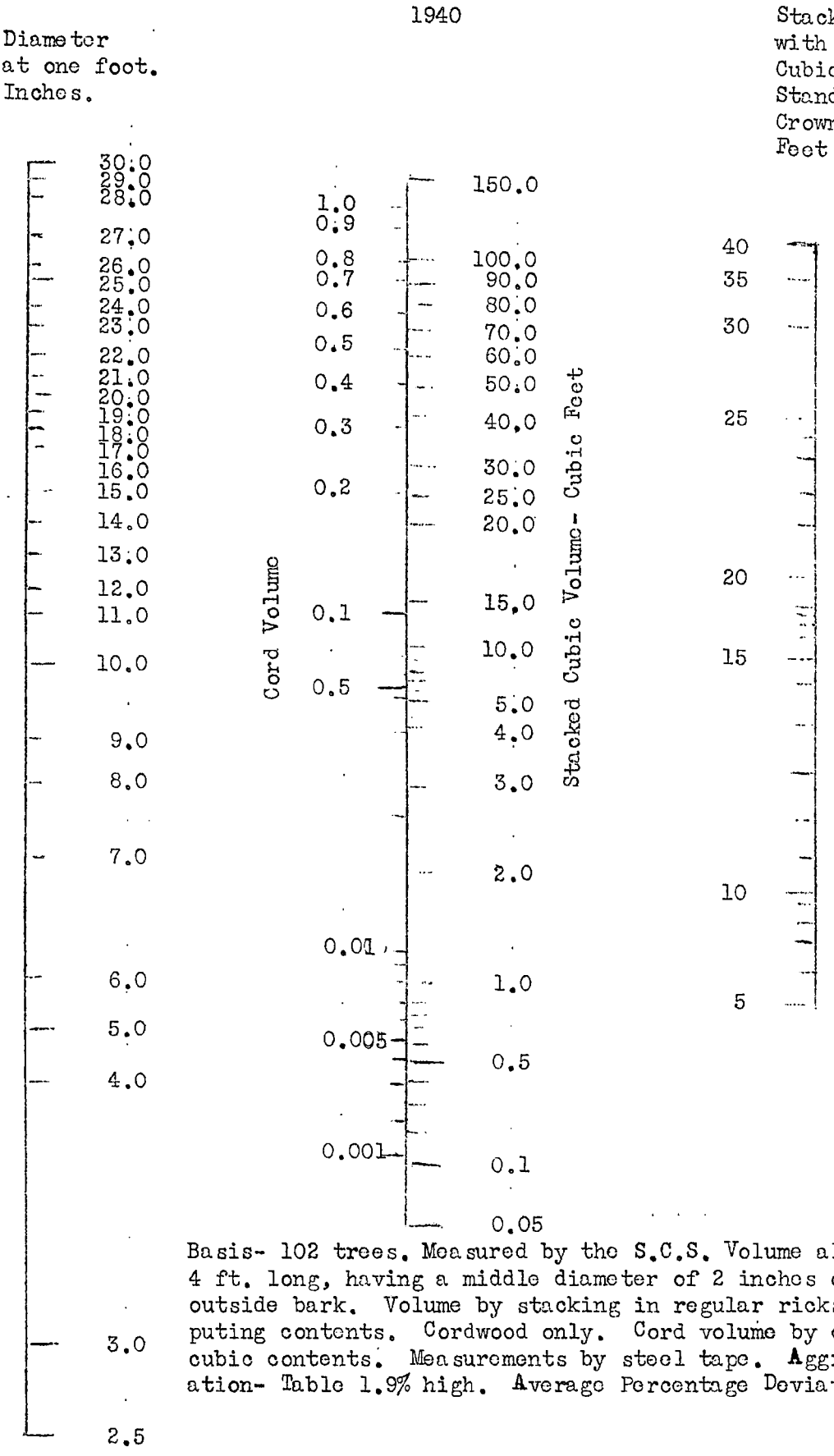
Dia. at One Foot Inches	Crown Width-Feet								Basis No. of Trees
	5	10	15	20	25	30	35	40	
	Stacked Volume-Cubic Feet								
3	0.08	0.20	0.82						8
4	0.57	0.92	1.83						6
5	0.75	1.08	2.15	2.62					16
6	0.94	1.27	2.50	3.00					16
7	1.33	1.98	3.32	4.15					5
8	1.71	2.33	4.09	6.60					8
9		2.65	5.15	8.95					8
10		3.14	8.80	13.50	19.60				3
11		3.55	11.80	15.75	22.60				3
12		3.80	13.50	16.50	25.10				3
13		4.30	14.80	17.50	28.45	34.80			4
14		5.10	16.25	18.75	32.00	37.90			7
15		6.40	17.25	19.80	35.00	41.25			2
16			18.00	20.60	37.00	44.15			3
17			19.00	22.75	39.00	48.00	56.50		3
18			19.30	25.00	40.80	52.00	60.00		0
19			20.00	26.70	43.75	55.00	64.10		0
20			20.70	28.20	45.30	58.25	67.50	72.80	2
21				29.40	49.40	61.00	71.00	76.50	1
22				32.40	54.50	66.70	76.00	81.00	0
23				35.00	58.60	72.00	80.80	87.20	0
24				37.00	62.00	76.00	85.00	92.00	3
25				39.50	68.00	80.40	92.00	98.00	0
26					70.75	83.20	95.00	102.00	1
27					79.40	90.00	102.50	110.00	0
28						100.00	112.00	122.50	0
29						105.50	119.00	128.00	0
30							124.50	135.00	0
Basis	6	39	34	11	8	3	0	1	102

Basis 102 trees. Measured by the S.C.S. All sticks 4 feet long, having a middle diameter of 2 in. or more, outside bark. Volume by stacking in regular ricks and computing contents. Cord wood only. Measurements by steel tape. Aggregate deviation- Table 1.9% high. Average percentage deviation, 30.5%.

Juniperus Scopulorum
(Rocky Mt. Red Cedar)

Stacked Volume in Cubic Feet and Standard Cords. Based on Diameter at One Foot in Inches and Crown Width in Feet.

J. Howell, Jr. New Mexico-Arizona 1940



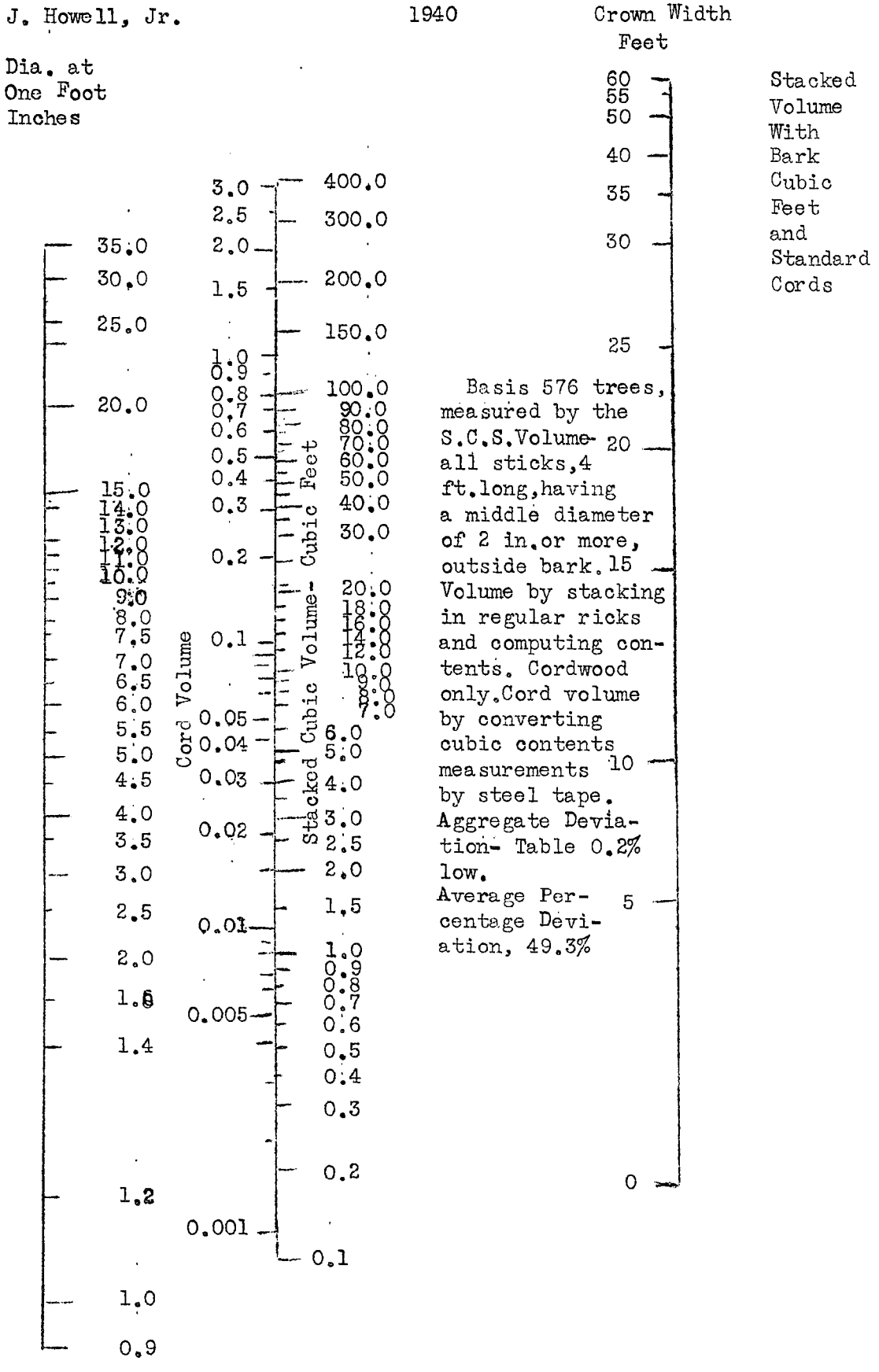
Basis- 102 trees. Measured by the S.C.S. Volume all sticks, 4 ft. long, having a middle diameter of 2 inches or more, outside bark. Volume by stacking in regular ricks and computing contents. Cordwood only. Cord volume by converting cubic contents. Measurements by steel tape. Aggregate Deviation- Table 1.9% high. Average Percentage Deviation, 30.5%.

Juniperus Monosperma
(One-Seed Juniper)

Stacked Volume in Cubic Feet and Standard Cords. Based on Diameter at One Foot in Inches and Crown Width in Feet.

Arizona-New Mexico

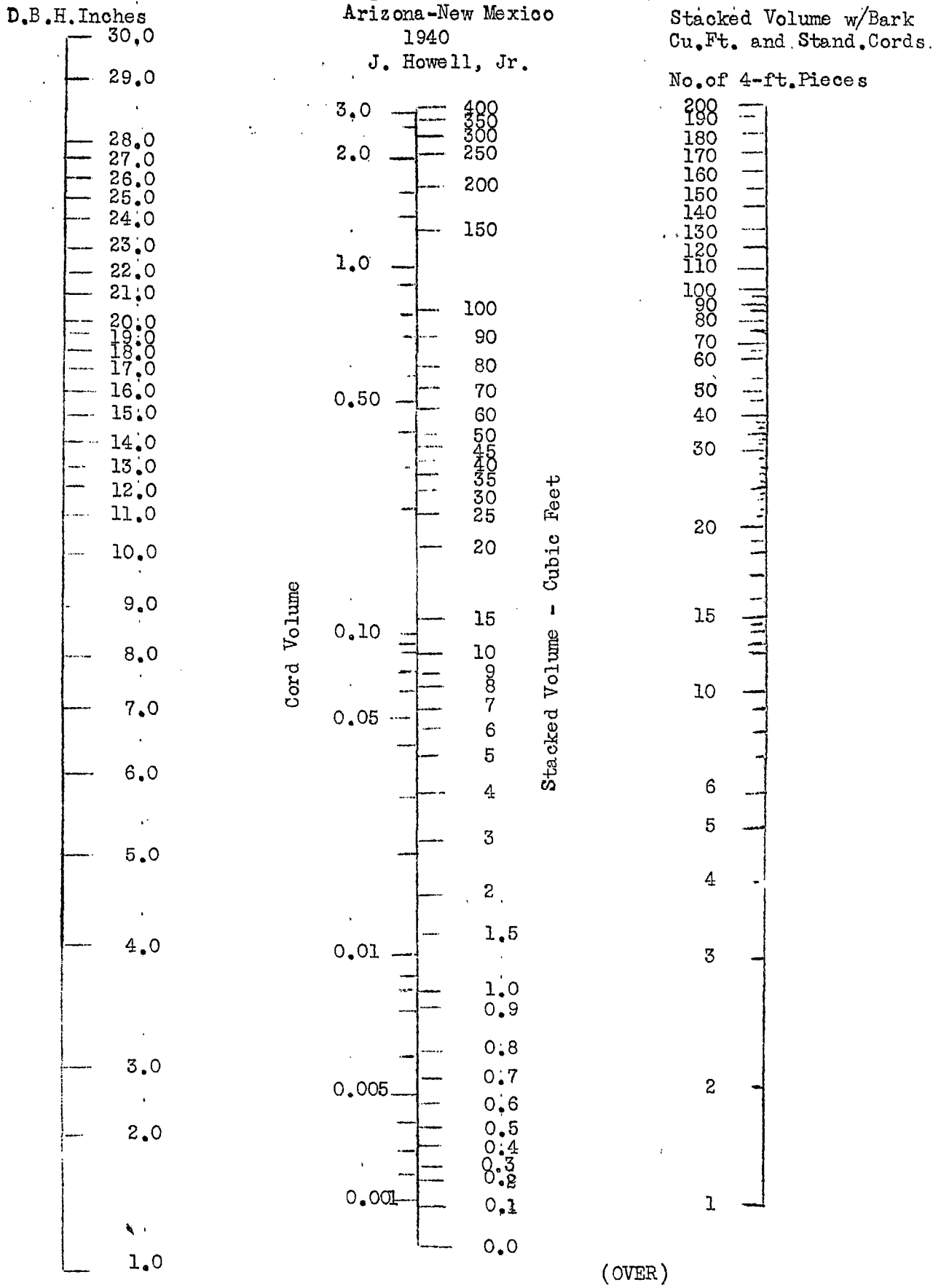
J. Howell, Jr. 1940



Basis 576 trees, measured by the S.C.S. Volume- all sticks, 4 ft. long, having a middle diameter of 2 in. or more, outside bark. Volume by stacking in regular ricks and computing contents. Cordwood only. Cord volume by converting cubic contents measurements by steel tape. Aggregate Deviation- Table 0.2% low. Average Percentage Deviation, 49.3%

Pinus Edulis
(Pinon)

Stacked Volume in Cubic Feet and Standard Cords. Based on Diameter at Breast Height and Number of 4-ft. pieces.



(OVER)

Bases- 551 trees. Measured by the S.C.S. Volume- All sticks 4-feet long, having a middle diameter of 2 inches or more, outside bark. Volume by stacking in regular ricks and computing contents. Cord-wood only. Cord volume by converting stacked cubic volume.
Aggregate Deviation- Table 1.7% high.
Average Percentage Deviation, 25.5%.

Pinon

(Pinus edulis Engelm.)

Stacked Volume, Cubic Feet, Based on Diameter in Inches at Breast Height and Number of Four-Foot Pieces

Arizona-New Mexico

1940

J. Howell, Jr.

Stacked Volume With Bark Cubic Feet

D.B.H. Inches	Number of 4-Foot Pieces																				Basis No. of Trees
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	Stacked Volume - Cubic Feet																				
1	0.06	0.17	0.53	0.69	0.79	0.82															8
2	0.25	0.54	0.80	0.89	1.07	1.21	1.35	1.48	1.62	1.70	2.00	2.05	2.08	2.18							41
3	0.46	0.69	0.88	1.12	1.35	1.55	1.75	1.90	2.03	2.35	2.45	2.50	2.63	2.79	2.83	3.10	3.30	3.68	3.90	4.00	54
4	0.72	0.86	1.33	1.75	2.18	2.35	2.68	3.00	3.23	3.42	3.90	3.93	4.08	4.18	4.30	4.55	4.80	5.20	5.50	5.60	65
5	0.84	1.17	1.86	2.42	3.00	3.40	3.80	4.05	4.30	4.57	5.05	5.18	5.35	5.47	5.55	6.00	6.40	7.10	7.60	7.95	57
6	1.06	1.57	2.45	3.30	3.93	4.40	4.82	5.15	5.50	5.78	6.70	7.00	7.10	7.40	7.50	8.00	8.75	9.60	10.50	11.20	63
7	1.33	1.96	3.21	4.14	4.78	5.28	5.85	6.40	7.00	7.40	8.50	8.78	9.00	9.40	9.60	10.30	12.00	13.50	14.75	15.00	57
8	1.62	2.30	3.80	4.73	5.50	6.30	7.10	8.70	8.50	9.00	10.00	11.15	11.80	12.00	12.70	13.45	15.05	16.10	16.70	17.15	43
9		2.78	4.43	5.40	6.58	7.55	8.50	9.20	9.90	11.20	13.45	14.00	14.50	15.10	15.20	16.00	16.95	18.20	18.60	18.90	28
10		3.50	5.12	6.50	8.00	9.10	10.40	12.05	13.40	14.20	16.00	16.35	16.70	17.00	17.30	17.80	18.75	19.95	20.70	21.40	28
11			5.65	7.50	9.20	10.75	12.70	14.10	15.25	16.00	17.50	17.75	18.25	18.50	18.75	19.30	20.50	22.30	23.25	24.00	10
12			6.30	8.38	10.00	12.60	14.50	15.70	16.55	17.25	18.55	18.80	19.25	19.45	19.70	20.50	22.00	24.25	25.80	26.90	5
13				9.00	11.50	13.75	15.40	16.55	17.25	18.40	19.30	19.60	20.00	20.40	20.90	21.80	23.50	26.30	29.25	29.80	2
14				9.60	12.70	15.00	16.25	17.20	18.00	18.75	20.00	20.45	21.00	21.75	22.25	22.50	25.40	29.50	31.90	33.10	1
15					14.40	16.00	17.35	18.20	19.00	19.60	21.90	22.30	23.25	23.50	24.15	25.70	29.20	33.00	35.80	37.20	1
16					15.40	17.25	18.20	19.15	19.85	20.50	23.75	24.00	24.80	25.25	26.50	29.25	32.00	37.00	40.25	41.80	0
17						17.75	19.00	19.80	21.00	22.30	25.00	26.75	27.75	29.25	29.60	31.75	35.00	41.00	44.00	45.50	0
18						18.50	19.60	21.00	22.50	23.60	28.25	29.00	29.85	31.00	32.40	34.50	39.00	44.75	48.20	50.00	0
19								22.30	23.50	25.00	29.75	31.00	33.00	33.60	35.00	38.00	42.00	48.00	51.10	53.00	0
20								23.25	24.90	27.50	31.80	33.00	34.50	35.75	37.20	40.20	45.00	51.25	54.00	55.75	0
Basis	59	57	60	47	34	27	27	25	16	10	15	12	14	9	8	6	8	7	10	10	463

Basis, 551 Trees. Measured by the S.C.S. Volume, all sticks, 4-feet long, having a middle diameter of 2 inches or more, outside bark. Volume by stacking in regular ricks and computing contents. Cord wood only. Measurements by steel tape.

Aggregate Deviation- Table, 1.7% high.

Average Percentage Deviation, 23.5%.

D.B.H.	Number of 4-Foot Pieces																				Basis
	22	24	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	No. of
Inches	Stacked Volume - Cubic Feet																				Trees
5	8.45	8.90	9.80	12.10	14.20																0
6	12.20	12.80	15.00	16.50	17.30	18.00															1
7	15.70	16.20	17.50	18.80	19.80	20.80	22.80														6
8	17.75	18.25	19.35	21.00	23.00	24.80	27.50	30.00													7
9	19.40	20.00	22.00	24.90	28.00	31.00	34.50	37.10	40.50	43.25	47.00										5
10	22.50	23.40	27.00	31.75	35.00	40.00	43.50	47.80	50.50	53.70	57.00	62.00									3
11	25.60	27.75	32.00	37.20	42.50	47.00	51.00	55.00	57.00	61.20	67.00	71.80	76.00								11
12	29.10	31.00	35.80	43.00	48.00	52.50	56.50	61.40	65.25	69.00	73.50	78.00	82.50	86.60							13
13	32.50	34.40	40.00	47.80	51.70	56.00	61.20	67.00	70.10	74.00	78.00	83.00	88.50	90.50	94.00						10
14	35.80	37.50	44.00	51.20	56.00	61.70	67.00	72.00	75.80	79.00	82.00	87.00	91.00	95.00	98.00	102.00					13
15	40.25	43.00	50.00	56.00	62.00	68.00	72.00	78.00	81.00	84.00	88.50	92.00	96.00	100.00	104.00	107.00	112.00				4
16	44.90	47.50	53.80	61.25	68.00	74.00	79.00	83.00	86.00	89.00	92.00	96.00	100.00	105.00	108.00	113.50	118.00	125.00			4
17	49.00	51.20	58.00	67.50	73.80	79.00	83.80	87.00	90.10	93.50	96.00	101.00	105.00	110.00	115.00	120.00	122.00	133.50	140.00		2
18	52.50	55.00	62.70	72.00	78.00	83.00	87.25	90.75	94.00	96.50	100.00	105.00	108.00	115.00	122.00	127.50	134.00	140.00	148.00	150.00	2
19	56.00	58.50	68.00	76.30	82.00	86.75	90.50	95.00	97.00	100.00	104.00	108.50	114.00	122.00	127.00	134.00	141.00	148.00	155.00	157.50	1
20	58.75	62.20	71.00	79.10	84.50	89.40	93.00	97.00	100.00	103.50	107.00	113.00	118.00	127.50	134.00	139.00	145.00	155.00	160.00	168.00	1
21			76.00	84.50	89.90	94.00	97.20	102.00	105.00	109.00	114.00	120.00	127.50	135.00	142.00	148.00	155.00	163.00	175.00	180.00	2
22				89.00	94.00	97.00	102.50	107.00	110.00	116.00	122.00	129.00	135.00	144.00	149.00	158.00	168.00	176.00	189.00	195.00	1
23					98.00	102.50	107.50	113.50	118.00	122.50	130.00	137.50	145.00	152.00	161.00	170.00	182.00	190.00	205.00	215.00	0
24					104.00	108.50	116.00	122.00	127.50	134.00	140.00	148.00	155.00	168.00	175.00	188.00	200.00	216.00	230.00	240.00	1
25						115.00	122.50	130.00	135.00	140.50	148.00	157.50	167.00	178.00	190.00	202.00	215.00	230.00	247.00	265.00	0
26						122.00	130.00	137.50	144.00	148.00	158.00	168.00	177.00	193.00	205.00	220.00	237.00	245.00	267.50	283.00	0
27							137.50	145.00	150.00	158.00	168.00	182.00	192.00	210.00	223.00	236.00	250.00	272.00	295.00	310.00	0
28								150.00	160.00	168.00	177.00	190.00	205.00	222.50	237.00	250.00	275.00	293.00	313.00	340.00	0
29									195.00	205.00	222.50	235.00	255.00	277.50	300.00	330.00	365.00	400.00	465.00	510.00	1
30										240.00	255.00	277.00	300.00	343.00	382.00	430.00	480.00	588.00	660.00	760.00	0
Basis	19	22	13	13	7	4	0	2	2	2	2	0	0	1	0	0	0	0	1	0	88

Pinon
(Pinus edulis, Engelm)
Cord Volume, Based on Diameter in Inches at Breast Height and Number of Four-Foot Pieces
Arizona-New Mexico
1940

J. Howell, Jr.

Cord Volume With Bark Standard Cord

D.B.H. Inches	Number of 4-Foot Pieces																				Basis No. of Trees
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	Cord Volume - Standard Cord																				
1	0.0005	0.0013	0.0041	0.0054	0.0062	0.0064															8
2	0.0019	0.0042	0.0063	0.0069	0.0084	0.0095	0.0105	0.0116	0.0127	0.0133	0.0156	0.0162	0.0163	0.0170							41
3	0.0036	0.0053	0.0069	0.0088	0.0106	0.0121	0.0137	0.0148	0.0157	0.0184	0.0191	0.0195	0.0206	0.0218	0.0221	0.0242	0.0258	0.0288	0.0305	0.0312	54
4	0.0056	0.0067	0.0104	0.0137	0.0170	0.0184	0.0209	0.0235	0.0253	0.0267	0.0305	0.0307	0.0319	0.0325	0.0336	0.0356	0.0375	0.0406	0.0430	0.0438	65
5	0.0066	0.0091	0.0145	0.0189	0.0234	0.0266	0.0297	0.0316	0.0336	0.0357	0.0395	0.0405	0.0418	0.0427	0.0434	0.0469	0.0500	0.0555	0.0594	0.0621	57
6	0.0083	0.0123	0.0190	0.0258	0.0307	0.0344	0.0377	0.0402	0.0430	0.0452	0.0524	0.0570	0.0554	0.0578	0.0586	0.625	0.0684	0.0750	0.0820	0.0875	63
7	0.0104	0.0153	0.0251	0.0323	0.0373	0.0413	0.0457	0.0500	0.0547	0.0578	0.0664	0.0686	0.0704	0.0734	0.0750	0.804	0.0938	0.1055	0.1153	0.1172	57
8	0.0127	0.0180	0.0297	0.0370	0.0430	0.0493	0.0554	0.0680	0.0664	0.0703	0.0781	0.0871	0.0922	0.0938	0.0992	0.1051	0.1175	0.1258	0.1305	0.1340	43
9		0.0217	0.0346	0.0422	0.0514	0.0590	0.0664	0.0718	0.0774	0.0875	0.1050	0.1094	0.1133	0.1180	0.1189	0.1251	0.1321	0.1422	0.1454	0.1476	28
10		0.0273	0.0400	0.0508	0.0625	0.0711	0.0812	0.0936	0.1046	0.1106	0.1250	0.1277	0.1304	0.1329	0.1352	0.1390	0.1465	0.1559	0.1501	0.1672	28
11			0.0441	0.0586	0.0718	0.0840	0.0988	0.1103	0.1192	0.1250	0.1367	0.1386	0.1427	0.1446	0.1472	0.1509	0.1601	0.1744	0.1817	0.1874	10
12			0.0492	0.0654	0.0782	0.0992	0.1133	0.1218	0.1293	0.1348	0.1450	0.1470	0.1504	0.1519	0.1540	0.1602	0.1719	0.1895	0.2016	0.2100	5
13				0.0703	0.0898	0.1074	0.1203	0.1293	0.1348	0.1438	0.1508	0.1532	0.1563	0.1581	0.1633	0.1704	0.1836	0.2054	0.2286	0.2329	2
14				0.0750	0.0992	0.1172	0.1260	0.1344	0.1407	0.1465	0.1563	0.1597	0.1641	0.1700	0.1735	0.1758	0.1983	0.2304	0.2492	0.2588	1
15					0.1125	0.1250	0.1356	0.1421	0.1485	0.1532	0.1711	0.1742	0.1818	0.1837	0.1887	0.2009	0.2280	0.2579	0.2796	0.2907	1
16					0.1203	0.1347	0.1422	0.1496	0.1550	0.1603	0.1855	0.1875	0.1938	0.1973	0.2070	0.2286	0.2500	0.2891	0.3146	0.3264	0
17						0.1395	0.1485	0.1548	0.1640	0.1743	0.1954	0.2090	0.2169	0.2284	0.2313	0.2480	0.2734	0.3204	0.3440	0.3556	0
18						0.1445	0.1531	0.1640	0.1758	0.1845	0.2209	0.2266	0.2332	0.2421	0.2530	0.2697	0.3046	0.3496	0.3767	0.3907	0
19								0.1741	0.1835	0.1954	0.2324	0.2421	0.2578	0.2627	0.2734	0.2970	0.3280	0.3750	0.4025	0.4142	0
20								0.1818	0.1945	0.2150	0.2484	0.2580	0.2696	0.2793	0.2905	0.3140	0.3517	0.4007	0.4220	0.4356	0
Basis	59	57	60	47	34	27	27	25	16	10	15	12	14	9	8	6	8	7	10	10	463

Basis- 551 trees. Measured by the S.C.S. Volume- all sticks 4 feet long, having a middle diameter of 2 inches or more, outside bark. Volume by stacking in regular ricks and computing contents. Cordwood only. Cord volume by converting stacked cubic volume.
Aggregate Deviation- Table 1.7% high.
Average Percentage Deviation, 25.5%.

D.B.H.	Number of 4-Foot Pieces																				Basis
	22	24	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	No. of
Inches	Cord Volume - Standard Cord																				Trees
5	0.0660	0.0696	0.0766	0.0946	0.1109																0
6	0.0954	0.1000	0.1172	0.1289	0.1352	0.1406															1
7	0.1226	0.1265	0.1367	0.1468	0.1547	0.1625	0.1782														6
8	0.1387	0.1425	0.1512	0.1640	0.1796	0.1937	0.2149	0.2346													7
9	0.1515	0.1563	0.1719	0.1945	0.2187	0.2421	0.2695	0.2900	0.3164	0.3380	0.3671										5
10	0.1757	0.1828	0.2109	0.2481	0.2734	0.3124	0.3400	0.3737	0.3946	0.4193	0.4453	0.4843									3
11	0.2000	0.2170	0.2500	0.2906	0.3320	0.3673	0.3984	0.4296	0.4453	0.4782	0.5237	0.5608	0.5938								11
12	0.2272	0.2421	0.2796	0.3360	0.3750	0.4100	0.4415	0.4796	0.5099	0.5394	0.5745	0.6093	0.6448	0.6772							13
13	0.2540	0.2688	0.3126	0.3730	0.4039	0.4374	0.4782	0.5240	0.5478	0.5780	0.6098	0.6484	0.6918	0.7068	0.7345						10
14	0.2799	0.2928	0.3440	0.4000	0.4376	0.4821	0.5234	0.5624	0.5922	0.6122	0.6408	0.6797	0.7104	0.7418	0.7658	0.7972					13
15	0.3143	0.3360	0.3904	0.4374	0.4845	0.5309	0.5623	0.6098	0.6327	0.6560	0.6915	0.7186	0.7504	0.7810	0.8122	0.8355	0.8745				4
16	0.3509	0.3710	0.4202	0.4787	0.5316	0.5784	0.6174	0.6482	0.6722	0.6953	0.7184	0.7500	0.7810	0.8200	0.8435	0.8862	0.9220	0.9765			4
17	0.3827	0.4001	0.4530	0.5275	0.5764	0.6170	0.6548	0.6800	0.7038	0.7201	0.7500	0.7882	0.8200	0.8590	0.8980	0.9372	0.9530	1.0425	1.0940		2
18	0.4102	0.4297	0.4898	0.5624	0.6093	0.6483	0.6816	0.7090	0.7342	0.7538	0.7810	0.8200	0.8440	0.8982	0.9530	0.9955	1.0472	1.0945	1.1555	1.1720	2
19	0.4377	0.4570	0.5310	0.5960	0.6405	0.6780	0.7065	0.7420	0.7580	0.7810	0.8125	0.8475	0.8908	0.9524	0.9920	1.0465	1.1020	1.1570	1.2110	1.2310	1
20	0.4590	0.4859	0.5548	0.6181	0.6600	0.6980	0.7265	0.7577	0.7810	0.8085	0.8357	0.8827	0.9220	0.9955	1.0472	1.0865	1.1335	1.2110	1.2500	1.3120	1
21			0.5937	0.6600	0.7026	0.7347	0.7594	0.7960	0.8103	0.8514	0.8900	0.9375	0.9955	1.0550	1.1095	1.1572	1.2120	1.2740	1.3670	1.4055	2
22				0.6956	0.7340	0.7578	0.8010	0.8360	0.8594	0.9060	0.9530	1.0077	1.0550	1.1250	1.1648	1.2350	1.3130	1.3750	1.4765	1.5240	1
23					0.7656	0.8006	0.8400	0.8860	0.9240	0.9562	1.0160	1.0745	1.1330	1.1865	1.2580	1.3280	1.4215	1.4845	1.6015	1.6800	0
24					0.8115	0.8479	0.9060	0.9528	0.9964	1.0474	1.0945	1.1575	1.2115	1.3130	1.3680	1.4700	1.5630	1.6880	1.7970	1.8760	1
25						0.8985	0.9570	1.0155	1.0545	1.0975	1.1560	1.2315	1.3060	1.3900	1.4845	1.5780	1.6800	1.7975	1.9300	2.0700	0
26						0.9520	1.0155	1.0748	1.126	1.1560	1.2340	1.3128	1.3828	1.5075	1.6015	1.7195	1.8520	1.9145	2.0905	2.2110	0
27							1.0750	1.1325	1.172	1.2340	1.3122	1.4220	1.5000	1.6400	1.7430	1.8445	1.9530	2.1250	2.3035	2.4220	0
28								1.1718	1.250	1.3122	1.3830	1.4835	1.6020	1.7380	1.8520	1.9530	2.1480	2.2890	2.4460	2.6540	0
29									1.5240	1.6015	1.7380	1.8360	1.9925	2.1695	2.3440	2.5785	2.8510	3.1245	3.6325	3.9875	1
30										1.8750	1.9915	2.1640	2.3410	2.6790	2.9825	3.3580	3.750	4.5910	5.1575	5.9400	0
Basis	19	22	13	13	7	4	0	2	2	2	2	0	0	1	0	0	0	0	1	0	88

Stuart R. Andrews

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
REGION 8

Albuquerque, New Mexico
November 8, 1940

Attached is Supplement No. 3 to Regional Bulletin No. 59, Woodland Series No. 8. These supplements will be issued from time to time and it is suggested that they be kept with the original bulletin.

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EXPERIMENT STATION

Juniperus monosperma
(One-seed Juniper)
Partial Volume in Cubic Feet Based on Diameter at
Breast Height in Inches and
Number of 4-foot Pieces
Arizona-New Mexico
1940.

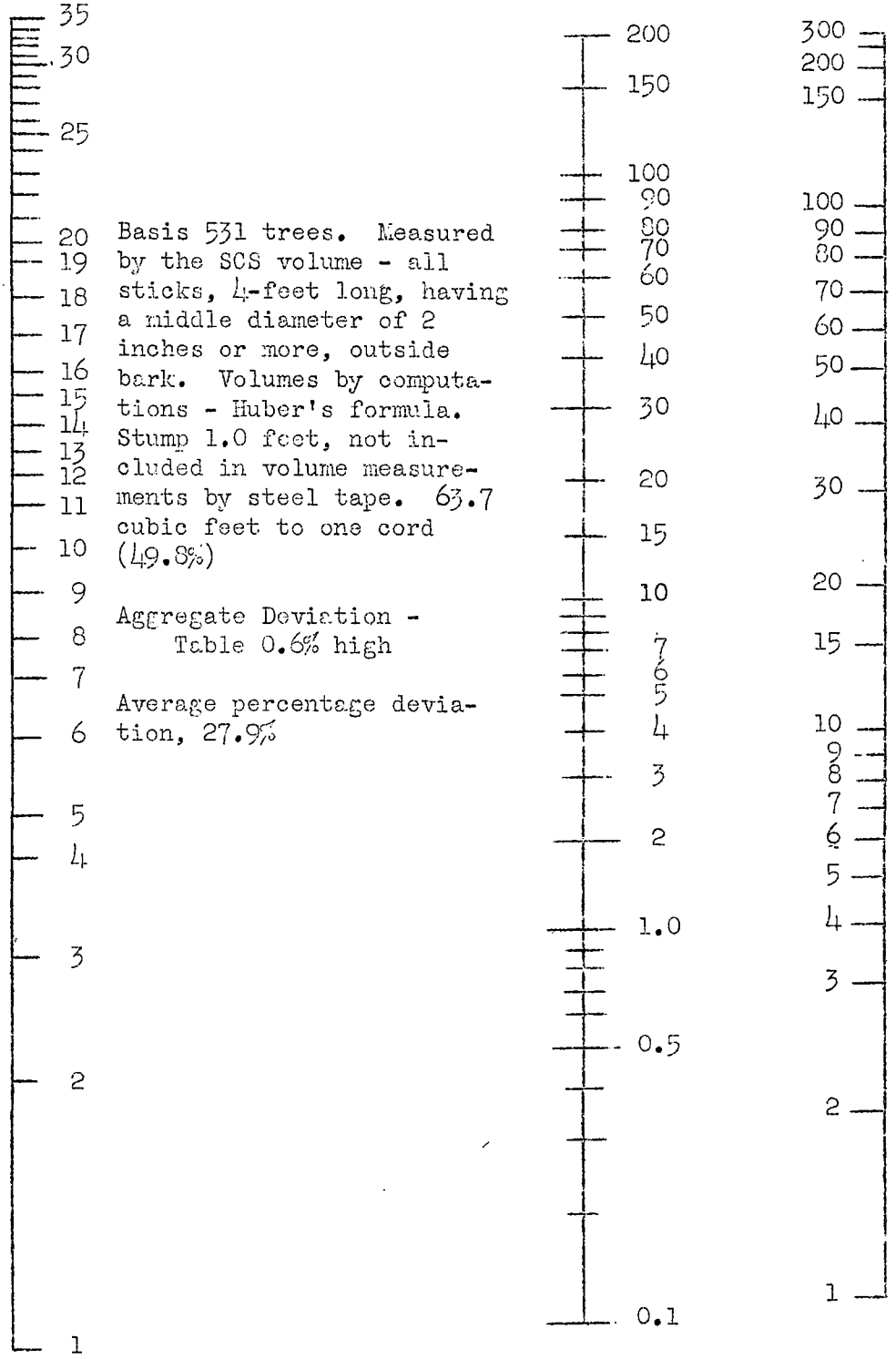
J. Howell, Jr.

Partial Contents
with bark
Cubic Feet

D.B.H.
Inches

Volume
Cubic Feet

No. of 4-foot
Pieces



Basis 531 trees. Measured by the SCS volume - all sticks, 4-feet long, having a middle diameter of 2 inches or more, outside bark. Volumes by computations - Huber's formula. Stump 1.0 feet, not included in volume measurements by steel tape. 63.7 cubic feet to one cord (49.8%)

Aggregate Deviation - Table 0.6% high

Average percentage deviation, 27.9%

One-Seed Juniper
(Juniperus monosperma (Engelm.) Sarg.)
Partial Volume in Cubic Feet Based on Diameter in Inches
at Breast Height and Number of 4-foot Pieces.
Arizona-New Mexico
1940

J. Howell, Jr.

Partial Contents
With Bark
Cubic Feet

D.B.H.	Number of 4-Foot Pieces																			Basis
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	No. of Trees
Inches	Cubic Volume - Cubic Feet																				
2	0.19	0.38	0.59	0.75	0.91	1.06	1.18	1.36	1.50	1.70	1.88	2.15	2.30	2.50	2.63	2.80	2.95	3.10	3.25	3.40	55
3	0.24	0.48	0.76	0.98	1.18	1.40	1.62	1.88	2.20	2.40	2.67	2.85	3.00	3.25	3.46	3.64	3.84	4.00	4.20	4.42	54
4	0.29	0.58	0.94	1.20	1.48	1.80	2.20	2.48	2.75	3.00	3.28	3.55	3.80	4.05	4.28	4.55	4.80	5.00	5.25	5.55	60
5	0.32	0.64	1.03	1.36	1.68	2.10	2.45	2.72	3.00	3.32	3.60	3.90	4.18	4.50	4.75	5.00	5.25	5.57	6.00	6.25	47
6	0.37	0.75	1.20	1.65	2.15	2.56	2.90	3.24	3.56	3.95	4.30	4.65	4.95	5.30	5.70	6.20	6.50	6.90	7.20	7.55	46
7		0.86	1.40	1.97	2.45	2.90	3.28	3.70	4.05	4.50	4.88	5.25	5.75	6.28	6.70	7.00	7.45	8.00	8.40	9.00	37
8		0.94	1.56	2.20	2.70	3.13	3.57	4.00	4.45	4.90	5.40	6.00	6.40	7.00	7.40	7.85	8.25	8.80	9.35	9.80	46
9		1.00	1.75	2.45	3.00	3.50	3.96	4.45	4.90	5.45	6.09	6.70	7.05	7.70	8.35	9.00	9.40	9.65	10.50	10.85	30
10			2.00	2.68	3.24	3.82	4.35	4.90	5.40	6.10	6.70	7.40	8.00	8.55	9.20	9.65	10.35	10.35	11.50	12.00	16
11			2.30	3.00	3.60	4.20	4.80	5.42	6.20	6.95	7.48	8.20	9.00	9.65	10.35	10.80	11.50	12.00	12.75	13.45	13
12			2.46	3.18	3.86	4.50	5.13	5.98	6.60	7.38	8.12	9.00	9.50	10.35	11.00	11.80	12.30	12.75	13.55	14.40	11
13			2.58	3.36	4.07	4.75	5.45	6.30	7.00	7.86	8.60	9.40	10.20	10.85	11.70	12.25	12.85	13.55	14.40	15.00	5
14			2.73	3.52	4.24	5.00	5.92	6.73	7.40	8.25	9.10	10.00	10.65	11.55	12.30	12.75	13.55	14.30	15.00	15.85	4
15					4.57	5.40	6.44	7.20	8.00	9.00	10.00	10.80	11.60	12.60	13.00	13.70	14.65	15.10	16.25	16.75	2
16					4.80	5.70	6.72	7.54	8.40	9.40	10.65	11.35	12.00	12.80	13.70	14.55	15.10	16.00	16.75	17.60	0
17									9.35	10.35	11.20	12.30	13.15	14.30	15.00	15.85	16.50	17.00	18.00	18.55	0
18												13.55	14.35	15.00	16.25	17.00	17.60	18.20	18.70	19.50	0
19																18.20	18.60	19.15	20.00	20.80	0
20																			20.90	21.50	0
Basis	25	31	42	41	32	43	28	18	20	22	20	22	18	10	7	15	7	9	5	11	426

Basis, 531 trees. Measured by the S.C.S. Volume - all sticks, 4-feet long, having a middle diameter of 2 inches or more, outside bark. Volumes by computations - Huber's formula. Stump 1.0 foot, not included in volume. Measurements by steel tape.
63.7 cubic feet to 1 standard cord (49.8%)
Aggregate Deviation - Table 0.6% high
Average Percentage Deviation, 27.9%

D.B.H.	Number of 4-foot Pieces																				Basis No. of Trees
	22	24	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	
Inches	Cubic Volume - Cubic Feet																				
2	3.72	4.50	4.90																		0
3	4.85	5.25	6.70	9.10																	1
4	6.30	6.80	8.75	11.75	14.65																3
5	7.00	7.60	9.68	13.00	16.20																4
6	8.40	9.40	11.35	15.30	18.40	20.90															6
7	9.80	10.85	13.50	17.40	20.00	23.00	26.75	30.25	33.60												10
8	10.80	11.80	14.60	18.50	21.75	25.25	28.90	32.70	36.10												11
9	12.00	13.90	16.00	19.75	23.55	27.50	32.00	36.10	39.50	43.35											10
10	13.40	14.40	17.25	21.25	25.50	30.25	35.00	38.75	43.20	47.50											6
11	14.45	15.90	18.55	22.80	28.25	33.50	38.40	43.00	47.60	52.00	58.25										10
12	15.75	16.75	19.50	24.70	30.10	35.70	40.00	46.50	50.00	54.20	60.50										8
13	16.50	17.50	20.10	25.60	31.80	37.00	42.00	47.75	53.00	55.25	64.50	70.00	76.00								8
14	17.00	18.20	21.65	26.80	33.40	39.85	44.80	50.00	54.25	58.30	67.00	75.00	80.00								5
15	18.00	19.15	22.40	28.80	35.75	41.40	47.80	53.00	57.25	62.00	70.25	80.25	84.00	86.00							5
16	18.60	19.80	23.40	30.25	37.00	43.10	49.00	55.00	59.50	64.25	74.75	82.50	88.00	90.00							5
17	19.85	21.00	25.10	33.00	40.00	46.50	53.00	58.00	63.50	68.00	80.25	88.00	91.50	94.50	96.00						2
18	21.50	22.30	27.00	35.00	43.10	50.00	57.20	61.80	67.00	73.00	86.00	92.50	96.00	100.00	102.00						5
19	23.00	24.00	29.85	38.10	46.50	54.00	59.75	65.50	72.00	80.10	90.25	98.00	102.50	105.50	109.00	112.00					2
20	24.00	25.10	30.40	39.35	48.40	56.00	61.50	68.00	76.00	83.00	92.50	100.25	106.00	109.00	112.00	120.00					1
21			32.00	41.60	50.10	58.20	64.25	70.75	80.10	86.00	96.00	105.00	110.00	113.50	116.00	122.00	123.00				0
22			33.80	44.00	53.50	59.50	66.80	76.00	83.00	89.00	100.00	109.00	114.00	118.00	122.00	125.00	127.50				1
23			35.60	46.00	55.40	62.00	69.00	80.00	86.00	91.25	104.00	113.00	117.50	122.00	125.00	130.00	133.00	135.00			0
24				47.75	57.00	64.00	72.00	82.00	88.10	94.25	107.00	117.00	122.00	126.50	130.00	132.50	137.50	138.25			1
25				49.00	58.10	65.80	75.00	85.00	90.25	97.00	110.00	120.00	127.00	132.00	132.50	137.50	140.00	144.00	147.50		0
26				50.25	59.00	67.20	78.00	86.20	92.00	99.00	112.50	122.50	129.00	132.50	137.00	140.00	145.00	147.00	150.00		0
27					60.00	69.75	80.80	88.50	94.75	102.50	116.50	127.50	132.25	137.50	140.00	145.00	150.00	151.00	155.00	156.00	0
28					62.00	71.00	83.50	90.00	97.00	105.00	119.00	130.00	135.00	140.00	144.00	150.00	152.50	156.00	158.00	160.00	0
29					63.80	73.00	84.00	91.75	98.00	106.50	121.50	132.50	137.50	144.50	148.00	153.00	156.00	158.00	163.00	164.00	0
30					64.70	76.00	86.50	94.00	100.00	107.80	123.50	135.00	140.00	146.00	150.00	155.00	160.00	162.00	167.00	170.00	1
31							87.00	95.00	102.40	110.00	125.00	137.50	144.00	149.00	152.50	157.50	162.00	165.00	169.00	172.00	0
32									104.00	111.50	127.00	139.00	145.50	150.00	155.00	160.00	165.00	168.00	173.00	174.00	0
33												140.00	148.00	153.00	157.00	162.50	168.00	171.00	175.00	177.00	0
34													150.00	155.50	160.00	165.00	170.00	175.00	178.00	180.00	0
35													152.50	158.00	162.00	170.00	175.00	178.00	182.00	185.00	0
Basis	18	0	34	15	10	3	5	3	8	1	0	2	0	0	0	0	0	0	0	0	105